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FINANCIAL SUSTAINABILITY, LIQUIDITY AND OUTREACH OF DEPOSIT-TAKING MICROFINANCE INSTITUTIONS: EVIDENCE FROM LOW INCOME SUB-SAHARAN AFRICA

by

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DECLARATION

I, the undersigned, hereby declare that the research work presented in this thesis is my own original work and has not been considered for any degree or examination either in part or entirety at any other university.

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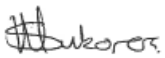
Signature:  Date: 21/09/2020

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ABSTRACT

The United Nations' Sustainable Development Goals regard microfinance provision as a developmental tool in fighting poverty and financial exclusion which are particularly rife in Low-Income Sub-Saharan Africa (LISSA). Therefore, this study analysed the financial sustainability, liquidity and outreach of LISSA Deposit-taking Microfinance Institutions (DTMFIs) through three objectives. The first objective investigated why the LISSA DTMFIs fall short in achieving financial sustainability despite having commendable deposit volumes. Panel data spanning 2006 to 2017 obtained through desk research from the Microfinance Information Exchange of 64 DTMFIs sampled across 18 LISSA countries was utilized. Through probit regression, the study found that the likelihood of attaining financial sustainability is reduced by small scale deposits, loan loss provisions, deteriorating loan portfolio quality and costly branch coverage. The study recommends low cost, large scale deposit operations; efficiency in managing operating expenses; credit enhancements; and restrictive deposit-taking licencing.

The second objective assessed the relationship between liquidity and deposit insurance as the LISSA DTMFIs default in meeting withdrawals on deposits. The fixed panel of 64 DTMFIs was utilized. The estimated random effects results showed that explicit deposit insurance is positive and significantly related to liquidity. The study concluded that designing and implementing explicit deposit insurance schemes mitigates liquidity risk in depository microfinance. Therefore, the LISSA regulators ought to include microfinance deposits in formulating deposit insurance policies.

The third objective examined whether pursuing outreach and financial sustainability in depository microfinance exhibit a trade-off or mission drift, as this is not yet clear for deposits. The System Generalized Method of Moments was adopted, using the fixed panel of 64 DTMFIs. No significant relationship was found between financial sustainability and the average deposit balance (outreach depth); but financial sustainability was negative and significantly related to number of depositors (outreach breadth). The study concluded that in the LISSA's depository microfinance sector, there is neither a mission drift nor trade-off in outreach depth, but a trade-off exists in outreach breadth. Therefore, it is recommended that the DTMFIs segment their markets and develop appropriate deposit products for each market segment and also leverage on cost-efficient deposit-taking methods such as the use of agents and mobile phones.

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DEDICATION

This thesis is dedicated to my late mother and sister who never lived to see me climb the academic ladder.

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LIST OF ABBREVIATIONS AND ACRONYMS

ALCOs	Asset and Liability Committees
BCBS	Basel Committee on Bank Supervision
CA	Central Africa
CAR	Capital Adequacy Ratio
CEMAC	Economic and Monetary Community of Central African States
CGAP	Consultative Group to Assist the Poor
COMFIs	Credit-only Microfinance Institutions
CPI	Consumer Price Index
CUCs	Credit Unions and Cooperatives
DTMFIs	Deposit-taking Microfinance Institutions
EA	Eastern Africa
FE	Fixed Effects
FSS	Financial Self-Sufficiency
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GLP	Gross Loan Portfolio
GMM	Generalised Method of Moments
GNI	Gross National Income
HICs	High Income Countries
IMF	International Monetary Fund
IPO	Initial Public Offering

ITC	International Trade Centre
IV	Instrumental Variables
LICs	Low Income Countries
LMICs	Lower Middle Income Countries
LISSA	Low Income Sub-Saharan Africa
LPT	Liquidity Preference Theory
MBB	Micro Banking Bulletin
MENA	Middle East and North Africa
MFBs	Microfinance Banks
MFIs	Microfinance Institutions
MDGs	Millennium Development Goals
MIX	Microfinance Information Exchange
MIVs	Microfinance Investment Vehicles
MSMEs	Micro, Small and Medium Enterprises
NA	Northern Africa
NBFIs	Non-Bank Financial Institutions
NGOs	Non-Governmental Organisations
OLS	Ordinary Least Squares
OSS	Operational Self-Sufficiency
RE	Random Effects
SA	Southern Africa
SADC	Southern Africa Development Community
SDGs	Sustainable Development Goals

SGMM	System Generalised Method of Moments
SSA	Sub-Saharan Africa
UMICs	Upper Middle-Income Countries
UN	United Nations
UNCTD	United Nations Conference on Trade and Development
USAID	United States Agency for International Development
VIF	Variance Inflation Factor
WA	Western Africa
WAEMU	West African Economic and Monetary Union
WDIs	World Development Indicators
WGIs	World Governance Indicators

CHAPTER ONE:
INTRODUCTION

1.1 Background of the study

The global rate of extreme poverty has been declining since 1991, but more than 400 million people continue to live below the international poverty line of US$1.90 a day in Sub-Saharan Africa (SSA) (Chikalipah, 2017; World Development Indicators (WDIs), 2017). Poverty is mainly rife in the Low-Income Countries (LICs) of Sub-Saharan Africa (SSA), henceforth Low-Income Sub-Saharan Africa (LISSA)[1]. Hence, the provision of microfinance to the poor and low-income households has long been regarded as an esteemed tool for poverty alleviation, financial inclusion and economic development amongst the world's poorest countries (Dokulilova, Janda and Zetek, 2009). Microfinance is the provision of financial services mainly in micro-amounts; microdeposits, microcredit, micro-insurance, microleasing, money transfer services, diaspora remittances and foreign exchange (Chikoko and Kwenda, 2013).

According to Agarwal and Sinha (2010), microfinance provision produces immediate results; it empowers women, youths and micro-entrepreneurs through financial access. As a result, the United Nations considered microfinance provision in the primary goal of the Sustainable Development Goal (SDG) of eradicating extreme poverty in all its forms across the world by the year 2030. This international policy was motivated by the pioneering microfinance model of Professor Muhammad Yunus, the Grameen Bank; which has successfully provided microcredit to the poor in Bangladesh since the 1970s. In the early days of modern-day microfinance provision, the traditional consensus of most microfinance stakeholders was that Microfinance Institutions (MFIs)[2] are poverty-oriented institutions whose primary mission is outreach; serving the poorest in their vast numbers through subsidised microcredit. The subsidies and donations from the Non-Governmental Organisations (NGOs) and the national governments kept the MFIs liquid and financially sustainable, thereby ensuring their short term and long-term survival in serving the poor with microcredit (Bogan, 2012).

[1] Detailed information on the LISSA countries is given in Section 1.2 and Chapter 2.

[2] Microfinance Institutions (MFIs) are either Deposit-taking Microfinance Institutions (DTMFIs) accepting deposits for intermediation into loans or Credit-only Microfinance Institutions (COMFIs) advancing credit only.

In the 1970s and 1980s, microfinance provision emphasised more on subsidised microcredit and less effort was made on mobilising deposits (Rozas and Erice, 2014). As a result, some microfinance stakeholders referred to deposits[3] as the "forgotten half" of microfinance (Helms, 2006, p. 24). Therefore, to spearhead the uptake of deposit products and services by the poor and low-income households, many microfinance regulators across the world extensively issued out deposit-taking licenses to MFIs (Riquet and Poursat, 2013). As focus by MFIs on deposit-taking increased, Gonzalez and Meyer (2009) observed that the poor and low-income households seemed to derive more utility from consuming deposit products than microcredit products. Consequently, there has been a phenomenal growth in the volume of deposits and the number of depositors, most notably in SSA. Between 2009 and 2015, SSA was the second world's leading region in terms of mobilising microfinance deposit volumes, and these exceed the gross loan portfolio volumes to date (Microfinance Information Exchange (MIX) and Consultative Group to Assist the Poor (CGAP), 2013; MIX, 2019).

As a result of the growth in deposit volumes in SSA and other world's regions, some researchers have argued that deposits are a means of achieving financial sustainability or self-sufficiency of Deposit-taking Microfinance Institutions (DTMFIs) (Brom, 2009; Dokulilova *et al.*, 2009; Ek, 2011; Hulme and Aran, 2011; Millson, 2013; Kaloo, 2015; Bayai and Ikhide, 2016a). Financial sustainability is the "capacity to obtain revenues to cover the transactional expenses, operational (administrative) expenses and financial (interest) expenses" (Shaoyan and Duwal, 2012, p. 234). Accordingly, financial sustainability has become the main gauge for measuring the success rate of both DTMFIs and Credit-only Microfinance Institutions (COMFIs) as it guarantees their longevity in serving the poor and low-income households with micro-financial services. According to Cull, Demirgüç-Kunt and Morduch (2009a), MFIs have to be self-sufficient institutions that rely on deposit financing as government funding, subsidised loans, grants and donations have been dwindling since the ushering in of the 2000s. The decline of subsidised microfinance models gave rise to commercialisation of microfinance whereby the MFIs had to look for other sources of capital such as deposits, funding from Microfinance Investment Vehicles (MIVs), debt and equity funding in search for financial sustainability (Ledgerwood and White, 2006). In addition, some empirics such as de Sousa-

[3] Deposits in microfinance are either voluntary (deposits that are intermediated into loans) or mandatory (deposits that are collateral security for loans and are not intermediated) (Robinson, 2004; de Sousa-Shields and King, 2005; Brom, 2009). Hereafter, the deposits refer to voluntary deposits, unless otherwise indicated.

Shields and Frankiewicz (2004), Muriu (2011) as well as Lützenkirchen and Weistroffer (2012) wrote that the interest payable on deposits boosts financial sustainability as it is relatively cheaper than the interest payable on commercial and wholesale funds. Thus, deposits form a cheap source of finance for microfinance service providers but still, these financial institutions have to remain afloat into the future if they are to attract deposits as well as other sources of commercial finance.

Bayai and Ikhide (2016a) affirmed that deposits have become the main source of financing for MFIs in all the world's regions except in the Middle East and North Africa (MENA) where there is a heavy reliance on equity funding. On the contrary, Quayes (2012, p. 3421) argued that "with very few exceptions, a microfinance institution does not rely on deposits as its primary source of funds". Roodman and Quereshi (2006) additionally argued that deposits are a preferable funding option for DTMFIs in achieving financial sustainability due to the few conditions attached to them; furthermore, they present less managerial stress than the wholesale and capital market funds. This realisation has also incited more researchers to conclude that deposits are a stable financing option for DTMFIs that strive to be financially sustainable (Ledgerwood *et al.*, 2006; Lützenkirchen and Weistroffer, 2012). However, some researchers are opposed to this view as they argue that the high costs of mobilising small average deposit balances suppress the financial sustainability of DTMFIs (de Sousa-Shields and King, 2005). Deposits are also linked to regulatory costs and deposits must accumulate beyond a certain threshold before they can edify financial sustainability (Robinson, 2004; Ledgerwood and White, 2006). Furthermore, the study by Brom (2012) revealed that some deposit products are volatile as they are highly transitory and often reduce the chances of attaining financial sustainability. Nevertheless, de Sousa-Shields and Frankiewicz (2004) cautioned that looking into deposits as a source of funding does not mean that MFIs should revoke their traditional sources of funding.

Ditcher and Harper (2007) estimated that out of the approximately 10 000 MFIs that were operational in the year 2007 across the world, only 3 to 5 % had attained full financial sustainability. It has also been postulated that MFIs with annual reported losses of 5 % are unsustainable (Rosenberg, Gaul, Ford and Timilova, 2013). Despite the commendable growth in the deposit volumes in SSA and their advantages, the SSA's depository microfinance sector as a whole is replete with records of DTMFIs that have been ailing and folding as they fall

short in attaining financial sustainability[4]. Boateng, Nortey, Barnie, Dwumah, Achaemponh and Ackom-Sampene (2016) gives an account of 50 financially unsustainable Ghanaian DTMFIs that folded in 2013. The situation was acute in the eastern, central and western parts of SSA as revealed by the empirical works of Riquet and Poursat (2013). Due to failure to be self-sufficient, a number of DTMFIs were placed under curatorship for a while in the LISSA countries between the years 2001 and 2011: Benin, 2; Burkina Faso, 1; Mali, 3; Niger, 2 and Togo, 3 (Riquet and Poursat, 2013).

Karim, Hanouch, Ketley and Sibande (2011) also observed that both DTMFIs and COMFIs in the southern parts of SSA struggled to achieve financial sustainability between the years 2000 and 2010 as their Operational Self-Sufficiency (OSS) ratio averaged 87.7 %. The benchmark OSS is 100 % (Bogan, 2012). One of the most notable cases of the disappearance of financially unsustainable microfinance providers amongst the LICs in the southern parts of SSA is the Zimbabwe case, where the number of licensed microfinance providers dropped to less than 150 in 2013, from a peak of more than 1600 in 2003 (Chikoko and Kwenda, 2013; Dube and Matanda, 2015). Thus, the crumbling of DTMFIs is a cause for concern for policymakers and the rest of the microfinance stakeholders as the role of the DTMFIs in poverty alleviation and embracing financial inclusion of the vast unbanked poor and low-income households with deposit products and other financial services is continually threatened.

Another noticeable feature in the depository microfinance sector of SSA is that not only do the DTMFIs fall short in long term financial performance by failing to reach the financial sustainability mark; they also struggle in recording good short-term financial performance. This is the case because the LISSA DTMFIs have been found wanting in meeting withdrawals on deposits in full or part and timeously due to lack of operating with adequate levels of liquidity. Liquidity reflects the availability of cash to meet the short-term financial obligations of the DTMFIs (CGAP, 2009; Wambui and Wanjiru, 2016). Advancing loans and paying withdrawals on deposits with interest reflects the demand for liquidity while receiving loan repayments with interest and mobilising deposits reflects the supply of liquidity (Miamidian, 2005; Ogol, 2011; Gietzen, 2017). Thus, despite having deposits as a source of liquidity, empirical studies reveal that DTMFIs fail to balance the supply and demand of liquidity (Ogol,

[4] This statement does not mean that there are no financial sustainable DTMFIs in SSA as there are some which are financial sustainable (Vanroose and D'Espailler, 2013).

2011) predominantly when there is panic by depositors to withdraw all their funds (Brom, 2009; 2012).

Empirical evidence shows that there have been threats of deposit runs in the depository microfinance sector of some SSA countries in the past and current decades as there has been a prevalence of records of depositors losing their funds to defaulting and disappearing DTMFIs. During the decade 2001 and 2011, 29 DTMFIs in the West African Economic and Monetary Union (WAEMU) and the Economic and Monetary Community of Central African States (CEMAC)[5] disappeared with depositors' funds (Riquet and Poursat, 2013). In these economic groupings, many DTMFIs from the LICs such as Benin, Burkina Faso, Mali, Niger and Togo, sank into oblivion with depositor's funds. Boateng *et al.* (2016) provide an account of 50 defaulting Ghanaian DTMFIs in 2013. This happened because most of the countries in the SSA countries are devoid of deposit insurance schemes (Demirgüç-Kunt, Kane and Laeven, 2015; Mecagni, Marchettini and Maino, 2015; International Monetary Fund (IMF), 2016a). The situation is worsened by the fact that the protection of microfinance deposits through adherence to capital adequacy standards based on the Basel Accords' recommendations is also very minimal in SSA (Mecagni *et al.*, 2015). This further indicates that depositors' funds in this region are highly exposed to liquidity risk. Thus, defaulting DTMFIs and those that have sunk into oblivion with deposits from the poor and low-income households make microfinance provision to become a poverty perpetuation tool in SSA, especially amongst the LICs.

It is inevitable to focus on the long-term survival of the DTMFIs as measured by the financial sustainability threshold and their short-term financial performance as measured by their liquidity positions without focusing on outreach; the poverty alleviation agenda of microfinance provision (Guntz, 2011; Amin, Qin, Rauf and Ahmad, 2017; Huq, Azad, Masun, Wanke, and Rahman, 2017). Thus, microfinance provision is premised on the 'double bottom line' approach; financial performance and social performance. Through outreach, MFIs aim to provide a wide array of financial services (breadth of outreach) to the poorest folk (depth of outreach) (Abera, 2010; Barbosha, 2013). Between 2005 and 2017, DTMFIs in SSA recorded commendable outreach statistics mainly through deposit-taking than through microlending. In 2005, the number of depositors stood at 4 100 000 and has been growing at an alarming rate since then till it reached a peak of 26 700 500 in the 2017-2018 fiscal year. It is also worth

[5] According to the International Monetary Fund (2016a), the WAEMU states are; Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo; and the CEMAC states include; Cameroon, Central African Republic, Chad; Congo, Republic of; Equatorial Guinean, Gabon.

mentioning that the number of depositors exceeds the number of active borrowers. Lafourcade, Isem, Mwangi and Brown (2005, p. 4) dubbed this phenomenon, "the African exception" as this feature is not observed in other world's regions. As mentioned earlier, the deposit volumes also exceed the volumes of the gross loan portfolios since the year 2009. (MIX, 2006; 2019). Despite these records of impressive outreach statistics, empirical literature reveals that there is an on-going and inconclusive debate on the nexus between outreach and financial sustainability of MFIs (Abdulai and Tewari, 2017b; Amin *et al.*, 2017; Huq *et al.*, 2017).

Empirical writers argue that the outreach and financial sustainability nexus exhibits relationships that are positive, neutral and negative (Huq *et al.*, 2017). The first group of researchers contends that where a positive relationship between outreach and financial sustainability exists, it means that intensifying outreach breadth through the provision of a wide array of financial products and services to a large number of clientele results in increased profitability which boosts financial sustainability (Zerai and Rani, 2013; Chikaza, 2015).

The second group of researchers is convinced that there is a neutral relationship (no trade-off) between outreach and financial sustainability. This group argues that increasing outreach to the poorest (depth of outreach) does not impede working towards attaining financial sustainability (Hartarska and Nadolnyak, 2007; Mersland and Strøm, 2010; Amin *et al.*, 2017). However, the third group of researchers argues that serving the poor is costly and this erodes profitability. In this case, the outreach-financial sustainability relationship is negative suggesting that there exists a trade-off in pursuing financial and social performance goals (Hermes, Lensink and Meesters, 2011; Xu, Copestake and Peng, 2016; Huq *et al.*, 2017; Reichert, 2018). Therefore, this has prompted MFIs to shift focus from the poorest clients who want small average balances of microfinance products and services, which is costly, to the better-off poor who want large average balances of microfinance products and services, which is less costly and motivated by the need to pursue financial sustainability. This phenomenon is called mission drift in microfinance literature (Cull, Demirgüç-Kunt and Morduch, 2007; Armendariz and Szafarz, 2011; Hermes *et al.*, 2011; Kar, 2013; Hermes and Hudon, 2018). However, Dokulilova *et al.* (2009, p. 2) disputed that "the poor are viable customers as long as their financing is appointed in their right way".

It has also been argued that the outreach-financial sustainability relationship varies across locations and depends on the variables used to measure outreach (Kipesha and Zhang, 2013; Yeshi, 2015), model specification (Kipesha and Zhang, 2013) and the goals to be

achieved (Churchill and Marr, 2017). In light of the aforementioned arguments, Bayai and Ikhide (2016b, p. 285) argued that "the exact nature of trade-offs in microfinance differ across regions, but meaningful trade-offs need to be recognised and weighted everywhere".

1.2 Low-Income Sub-Saharan Africa: A Brief Overview

The World Bank (2019, p. 43) reported that:

"…today, the global poverty rate is at its lowest point ever - a testament to the success of development efforts by the international community to end extreme poverty and promote shared prosperity. But progress is slowing, with poverty remaining high or even increasing in some places, particularly in Sub-Saharan Africa".

Extreme poverty which is the lack of income and access to life's basic needs such as water, health, education, food, electricity and means of production, is predominant in SSA because it has 27 out of 34 of the world's LICs (World Bank, 2018). According to the 2017 World Development Indicators of the World Bank, LICs have a Gross National Income (GNI) per capita of US$1 025 or less, using the Atlas calculation methodology. The LISSA countries include: Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros; Congo, Democratic Republic, Eritrea, Ethiopia, Gambia, The; Guinea, Guinea-Bissau, Liberia, Malawi, Mali, Madagascar, Mozambique, Niger, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Uganda and Zimbabwe.

The low level of the GNI per capita in the LISSA countries is one of the reasons for the high percentage of people that survive on US$1.90 a day (the international poverty line according to the World) in LISSA[6]: Madagascar, 77.8 %; Burundi, 77.7 %; Democratic Republic of Congo, 77.1 %; Malawi, 70.9%; and Liberia, 68.6 %. Bhorat, Kanbur and Stanwix (2015) noticed that extreme poverty in the LISSA countries is due to the extremely low minimum monthly wages earned by the working population. Data from the International Labour Organisation (ILO) (2019) reveals that the minimum monthly wages in LISSA ranges from as little as US$2 to a maximum of US$148 and the average minimum monthly wage for the region is US$53[7]. Furthermore, abject poverty in LISSA is perpetuated by the fact that the

[6] The World Bank also classifies all the LISSA countries (excluding Zimbabwe) as Heavily Indebted Poor Countries (HIPCs) that are eligible for concessional funding from the International Development Association (IDA) to help boost economic growth and poverty alleviation programs (refer to Appendix 1).

[7] Burundi and Uganda have the lowest minimum monthly wages while Comoros has the highest.

percentage of people living in rural areas in LISSA is also high, at more than 80 % in countries such as Burundi, Malawi, Uganda, Gambia, Niger and South Sudan. Moreover, statistics from the 2017 Global Findex database reveal that financial access as measured by the average percentage of people who have accounts in financial institutions and access to borrowing and savings facilities from financial institutions stands at 24.5 %, 7.9 % and 11.1 %, respectively. These statistics indicate that a larger part of the LISSA population is financially excluded.

1.3 Statement of the problem

Attainment of financial sustainability in the depository microfinance sector which guarantees its long-term survival has become a cause for concern, especially in Africa where the financial sustainability drive is more rampant (Ek, 2011). Several empirical writers have argued that deposits are a means of attaining the financial sustainability of DTMFIs as they are repayable at a low cost than the alternative sources of finance (Bogan, 2012; Barbosha, 2013; Bayai and Ikhide, 2016a). On the contrary, some strands of empirical evidence show that several LISSA DTMFIs in Benin, Burkina Faso, Central African Republic, Chad, Congo, Democratic Republic; Guinea-Bissau, Mali, Niger and Togo and in some parts of Southern Africa, failed to attain financial sustainability between the years 2001 and 2013 when they could leverage on the lowly priced deposit funds (Karim *et al.*, 2011; Riquet and Poursat, 2013; Boateng *et al.*, 2016). In Zimbabwe, the microfinance regulators recently placed one DTMFI under curatorship due to viability concerns (Reserve Bank of Zimbabwe (RBZ), 2020a). Following the collapse of MFIs over time, some researchers have reasoned that investors should not even attempt to engage in microfinance activities at all than to do so and subsequently operate unsustainably (Ditcher and Harper, 2007; Gashayie and Singh, 2015). Thus, the failure of the DTMFIs to live long is a problem because it thwarts the financial inclusion agenda of increasing financial access to the poor and low-income households through deposit products and other micro-financial services. This means that financial sustainability in and of itself is not an end; rather it is a means to an end, which is the continual delivery of micro-financial services to the poor and the low-income households.

Prior studies that have attempted to link deposits and financial sustainability found out that these variables can yield a positive, negative and neutral relationship (Bogan, 2012; Shaoyan and Duwal, 2012; Tehulu, 2013; Gashayie and Singh, 2015; Bayai and Ikhide, 2016a; Mwizarubi, Singh, Mnzvava and Prusty, 2016; Bayai and Ikhide; 2018). However, all these studies did not go further to examine why DTMFIs may still fall short in attaining financial

sustainability despite having deposits as a readily available and cheap source of financing their operations. This is crucial in Low Income Sub-Saharan Africa where the DTMFIs are expected to be viable institutions that are indefinite tools for eradicating extreme poverty. Moreover, a study of this kind also entices the depository microfinance stakeholders to devise strategies or mechanisms of treating the problems inherent with the disappearance of financial unsustainable DTMFIs.

The drive towards the attainment of financial sustainability which looks at the long-term financial performance of the LISSA DTMFIs is not complete without examining the short-term financial performance of these financial service providers. This brings to question, the liquidity of the LISSA DTMFIs. Operating with adequate liquidity levels has also become a challenge for the LISSA DTMFIs. Riquet and Poursat (2013) provide an account of LISSA DTMFIs that discontinued operations due to failure to meet their liquidity demands in the form of withdrawals on deposits, the interest on deposits and lines of credit between the years 2001 and 2011. In 2013, Boateng *et al.* (2016) recorded an account of 50 Ghanaian DTMFIs that folded and failed to honour their obligations to microdepositors. Thus, some LISSA DTMFIs have sunk into oblivion with depositors' funds. The failure of DTMFIs to be liquid is a problem as it has dire consequences such as contagion risk due to the sudden and unexpected deposit runs; oblivion of depositors' funds which further condemns the small savers into extreme poverty levels; and systemic risk as the whole financial sector is disturbed by the loss of depositors' confidence. In the WAEMU and the CEMAC states, the DTMFIs were placed under Target Government Administration (TGA) which was a 6 to 12 months supervisory tool for managing and bailing out illiquid DTMFIs (Riquet and Poursat, 2013). However, the TGA was a short-term solution for managing DTMFIs with liquidity problems and the TGA did not provide for the repayment of depositors' funds from the failed institutions nor guarantee the safety of the existing and future deposits. A long-term solution therefore is required as the safety of the depositors' funds is crucial for the soundness and safety of the entire financial system. Previous empirical studies that have looked at the liquidity of DTMFIs in SSA did not consider deposit insurance as one of the plausible solutions (Mata, 2011; Kimathi, Mugo, Njeje and Otieno, 2015; Bichanga, 2016; Mamathi, Aguma and Mwirigi, 2017; Maxwell, Lakshmi, Singh, Boohene and Aboagye, 2018). Therefore, examining the relevance of deposit insurance schemes in the management of the liquidity of LISSA DTMFIs is of paramount importance as it helps to mitigate the risk of sudden and unexpected runs on deposits in the depository microfinance sector.

Focusing on the financial performance of the LISSA's depository microfinance sector through examining their liquidity and financial positions is not complete without looking at their outreach because the DTMFIs are double bottom-line institutions that have to pursue both financial performance and social performance objectives concurrently. However, the attainment of the double bottom-line objectives of microfinance provision concurrently has sparked a debate amongst different microfinance stakeholders across the LISSA countries and across the world on which objective to prioritise; financial sustainability or outreach (Huq *et al.*, 2017). Upholding financial sustainability over outreach enables the MFIs to exist continually since its profitable while pursuing outreach as the primary goal enables the MFIs to reach out to the poorest populations (outreach depth) with a wide array of financial services (outreach breadth). The problem is that deepening outreach is costly as most of the poorest populations reside in inconvenient or scattered rural locations, and broadening the spectrum of financial services does not always result in gains in economies of scale thereby choking financial sustainability (WDIs, 2017; Zacharias, 2008). This prompts the MFIs to prioritise financial sustainability but it has been argued that this leads to mission drift; the shift of focus from the pro-poor clientele who consume financial products of small average balances to the better-off poor clientele who prefer large average balances (Armendariz and Szafarz, 2011).

Researchers and other stakeholders in the field have tried to find the optimal point where both outreach and financial sustainability can be achieved concurrently without any counter harm. This has resulted in some stakeholders to argue that there exists a trade-off in the attainment of the double bottom line objectives (Hermes *et al.*, 2011; Xu *et al.*, 2016; Huq *et al.*, 2017; Reichert, 2018) though some have argued that there is no trade-off (Hartarska and Nadolnyak, 2007; Mersland and Strøm, 2010). Churchill and Marr (2017) noted that trade-offs exist but their severity depends on the location studied. Accordingly, Bayai and Ikhide (2016b, p. 285) reiterate that "the exact nature of trade-offs in microfinance differ across regions, but meaningful trade-offs need to be recognised and weighted everywhere".

In light of the aforementioned arguments, additional research is thus required as the outreach-financial sustainability schism is still on-going and inconclusive. The conclusions that have been reached so far on the nexus between outreach and financial sustainability were based on studies that focussed on the microcredit arm of microfinance provision. Scanty or no literature exists on the outreach-financial sustainability nexus on the deposit-taking arm of microfinance provision. Thus, it is not clear as yet on whether the pursuit of financial

sustainability by the MFIs that mobilise deposits has led them to drift from their original mandate of serving the poorest populations to serving the wealthier clientele or an outreach-financial sustainability trade-off exists in increasing financial access through deposits.

1.4 Objectives of the study

This study aimed to analyse the performance of DTMFIs operating in the LISSA countries using three measures of performance; financial sustainability, liquidity and outreach. From this aim, three study objectives were derived, namely to:

1.4.1 Understand why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability?

1.4.2 Assess the relationship between liquidity and deposit insurance in the depository microfinance sector of the LISSA countries.

1.4.3 Examine whether there is any evidence of mission drift or a trade-off in the LISSA's depository microfinance sector in the pursuit of outreach and financial sustainability goals.

1.5 Research questions

From the three study objectives outlined above, three research questions were asked in this study:

1.5.1 Why does the depository microfinance sector of the LISSA countries fall short in attaining financial sustainability?

1.5.2 What is the relationship between liquidity and deposit insurance in the depository microfinance sector of the LISSA countries?

1.5.3 Is there any evidence of an outreach-financial sustainability trade-off or mission drift in the LISSA's depository microfinance sector?

1.6 Scope and Significance of the Study

This study analysed the performance of 64 LISSA DTMFIs based on an unbalanced panel dataset for the years 2006 to 2017 that was extracted from the MIX database. The sampled DTMFIs were drawn from the LICs of SSA based on the statistics from the World Bank which show that extreme poverty is on the rise in these countries. Therefore,

microfinance provision is much needed in the LISSA countries to fast track the lives of many people out of extreme poverty through financial access. However, this thrust is only possible if the providers of microfinance products and services live long by achieving and surpassing the financial sustainability threshold. As indicated earlier, DTMFIs in the LISSA countries fall short in attaining financial sustainability despite having large volumes of deposit finance. Therefore, venturing into this virgin research area will inform the LISSA depository microfinance managers on how to devise strategies or mechanisms of treating the problems that cripple their ability to attain financial sustainability.

The liquidity of the LISSA DTMFIs and the insurance of deposits they mobilise also have to be accounted for because some of these institutions have gone down the drain with depositors' funds and this problem has not been investigated in empirical studies. Therefore, this study is hoped to provide light to the managers, regulators and supervisors of DTMFIs on the importance of having custom made deposit insurance packages that curb panic and unanticipated withdrawals on deposits. In turn, the liquidity levels of the DTMFIs would be preserved or improved to sufficient levels that will enable them to meet their demands for liquidity with ease. It is also anticipated that depositor confidence will be boosted and downstream effects will be felt in the entire financial system since there are financial linkages between the microfinance sector and the conventional banking sector.

As noted in the background of this study, there is an on-going debate and inconclusive evidence on the relationship between outreach and financial sustainability. While the outreach-financial sustainability relationship has always been told from a microlending perspective using lending outreach variables, this study takes a different dimension and examines the outreach-financial sustainability relationship from a deposit-taking perspective using deposit outreach variables. This study is therefore hoped to provide an insight on the extent to which the depository microfinance sector in the LISSA region can work towards building sustainable and inclusive financial systems in the perpetual fight against poverty and financial exclusion using deposits. The results obtained are hoped to benefit the DTMFIs' managers; national, regional and international policy makers on how to balance social performance goals and financial performance goals.

The theoretical significance of the study lies in the strength of the adopted theories in explaining the interrelationships and determinants of the main variables of this study which are financial sustainability, liquidity and outreach.

1.7 Organisation of the Study

This study is organised into six chapters. Chapter one is the introductory chapter which outlines the background information, the problem statement that motivated the research, the research objectives and questions, the scope and significance of the study, how the study is organised and lastly, the limitations of the study.

Chapter two is an overview of the LISSA countries and the justification for the existence of the microfinance sector in these countries based on selected macroeconomic indicators. Chapter two also discusses the concepts of financial sustainability, liquidity and outreach. The chapter also provides a conceptual background of deposits held by DTMFIs and the concept of deposit insurance.

Chapter three provides the literature review which is categorised into three sections in line with the three objectives of the study. In each section, there is a theoretical literature review followed by the empirical literature review. The chapter then highlights the conceptual framework for the study that is drawn from the critical synthesis of the literature reviewed.

Chapter four focussed on the research methodology which is categorised into three sections in line with the objectives of the study. Each section has the following components; a description of the data used and the sources of data, the variables incorporated in the empirical models and the justifications of why they were used, the econometric model used and the specification of the empirical model adopted. Each objective is answered using its own econometric method.

Chapter five is a presentation and analysis of the results of the three objectives or research questions of the study.

Chapter six terminates the study by drawing and consolidating conclusions from the findings presented in Chapter five. This chapter also provides a highlight on the originality and contribution of the present study. The recommendations to different microfinance stakeholders as a way of addressing their requirements in the provision of microfinance products and services are also presented in this chapter. The limitations of this study and areas of further research are also highlighted in this chapter.

CHAPTER TWO:
MICROFINANCE IN THE CONTEXT OF LOW-INCOME SUB-SAHARAN AFRICA

2.1 Introduction

The microfinance sector in the LISSA countries is made up of formal and informal institutional networks that facilitate mobilisation of deposits or savings, loan disbursements and other micro-financial services. Therefore, this chapter aims to provide historical background on the evolution and role of microfinance provision in the LISSA countries. The chapter also focuses on the economic performance or growth of the LISSA countries in light of microfinance provision; followed by discussions on deposits and the concepts of financial sustainability, liquidity, deposit insurance, outreach, mission drift and trade-off.

2.2 Evolution and Role of Microfinance in Low-Income Sub-Saharan Africa

Microfinance provision can be traced back to the 1970s when there was rampant evolution of MFIs in Asia (Cull *et al.*, 2009a). Professor Muhammed Yunus pioneered the first microfinance model in Bangladesh by disbursing a collateral free loan of $27 to a group of 42 poor village women who used the credit line to finance their business projects. The loan repayment was successful, with a 100 % compliance and since then, microfinance provision in the form of village banks or the Grameen model spilled over to Latin America, SSA and other world's regions. This led to the emergence of MFIs which were mainly credit focussed targeting women, the poorest and the rural populations through solidarity lending as they were deemed uncreditworthy in the conventional banking system (Helmore, Chidiac and Hendricks, 2009). In Africa, the village banking model, a form of microfinance, was first replicated in Kenya through an institution called K-REP and the other pioneer MFIs were mainly the rural and postal savings such as the Tanzania Postal Bank and the Post Office Savings Bank in Zimbabwe (Basu, Blavy and Yulex, 2004). However, informal mechanisms for loans and savings also existed alongside such as the Rotating Savings and Credit Associations (ROSCAs) which were also called "susu" in Ghana, "mukando" in Zimbabwe, "banquiers ambulants" in Benin and "tontines" in Cameroon. Some informal microfinance networks still exist today and are being integrated into the main financial sector such as the "stokvels" of South Africa.

In early 1970s, semi-formal microfinance providers such as the Savings and Credit Cooperative Organisations (SACCOs) also emerged from the credit systems cooperatives that were involved amongst coffee cash crop farmers in Kenya and Tanzania. Between 1975 and 1985-90, semi-formal microfinance providers existed in the form of savings and credit cooperatives ("coopératives d'épagne et de crédit") in the both the rural and urban areas of some Eastern and Western African countries (Benin, Burkina Faso and Togo) and were generally referred to as "COOPECs" (Chao-Béroff *et al.*, 2000).

In the 1980s and 1990s, the microfinance sector in the LISSA countries saw the proliferation of Non-Governmental Organisations such as PRIDE and 3AE in Guinea; PADME and PAPME in Benin, amongst others (MIX, 2006; International Trade Centre (ITC), 2011). However, these institutions were mainly donor or government funded and this form of financing has not been sustainable for the continued existence of the MFIs as it has been dwindling over the years. Towards the end of the 1990s, the Non-Bank Financial Institutions infiltrated the microfinance sector and some Non-Governmental Organisations were transformed into Non-Bank Financial Institutions in search of profitability. Another developmental feature in the evolution of the microfinance sector in LISSA in the 1990s was that there was a sub-regional concentration of MFIs; cooperatives in Western Africa, Non-Bank Financial Institutions in Eastern Africa, Non-Governmental Organisations and banks in Southern Africa and Central Africa (MIX, 2006; Bertrand, 2011; United Nations, 2013). The development of microfinance in Eastern Africa can be classified as an outlier because of the telecommunications revolutions in Kenya that enabled the quick widespread of provision of microfinancial services through mobile phone platforms across the subregion (refer to section 2.2.ii). At the dawn of the 2000s, there was a paradigm shift of focus from microcredit to deposit mobilisation which resulted in the number of depositors exceeding the number of active borrowers. This was a direct result of extensive licencing of COMFIs into DTMFIs especially in the WAEMU and CEMAC economic blocks.

In 2005, 26 Greenfield MFIs[8] penetrated the microfinance sector in Africa thereby changing the sector's landscape in terms of financial performance, growth and outreach through retail banking services and extensive coverage (Cull, Harten, Nishida and Bull, 2014). According to Horizon Africa Capital (2017) as well as Chikalipah (2018), the microfinance

[8] Greenfield MFIs are "institutions that are created without any pre-existing organisation" (Cull *et al.*, 2014, p. 2).

sector in the LISSA countries and the rest of Africa has been growing commendably since then at approximately 10 % per annum. The contributing factors for this growth include, inter alia; downscaling of commercial banks into microfinance provision (Lafourcade *et al.*, 2005; Al-Azzam, Mimouni and Ali, 2012; Bangoura, 2012), growth of mobile financial services (IMF, 2016b), involvement of the national governments in the microfinance sector (CGAP, 2012) and economic growth (Borjesson and Hulten, 2016). However, Chikalipah (2017) observed that the growth and performance of MFIs in the LISSA countries is stifled by its weak institutional environments, so regulation became inevitable. National microfinance policies have been drafted and put in place across several LISSA countries (MIX and CGAP, 2008).

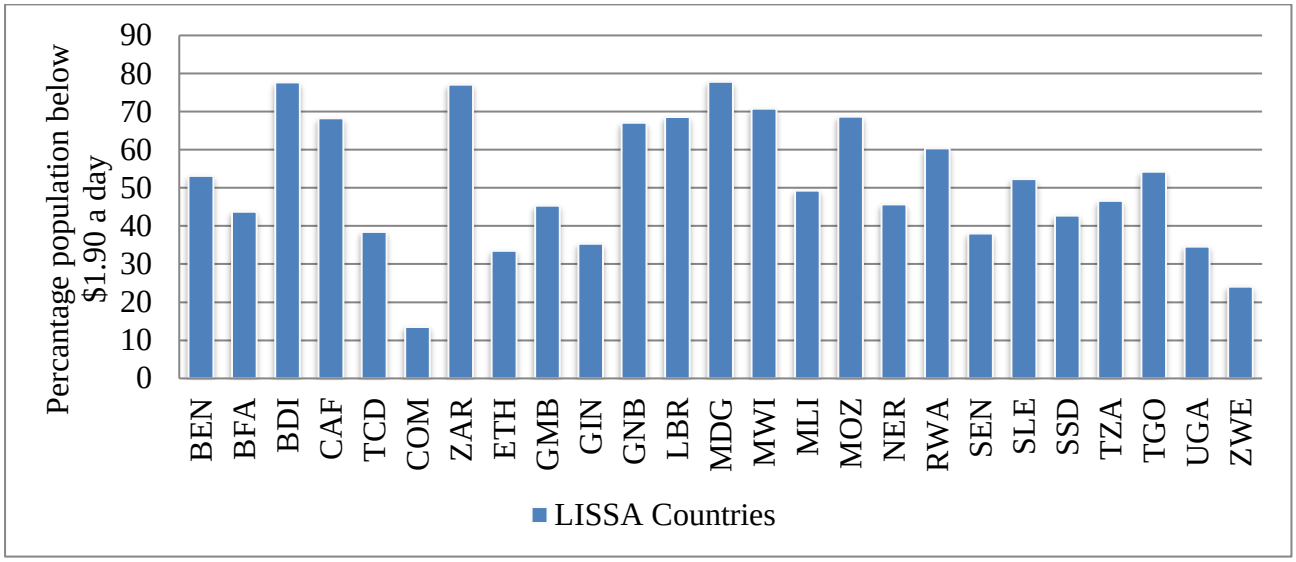
The MFIs in the WAEMU economic cluster are mainly regulated by the PARMEC law which was issued in the 1990s whilst the microfinance sector in other LISSA countries is regulated through acts of parliament that govern the operations of banking institutions. In 2009, Microfinance Investment Vehicles (MIVs) entered LISSA providing funding to the microfinance sector following the souring of liquidity in both MFIs and the banking sector after the Global Financial Crisis (GFC) of 2008 (refer to Figure 2.11). Between 2010 and 2019, advances in information and technology brought revolutionary changes in the LISSA countries' microfinance sector through the adoption of financial technology (FinTech) in the delivery of micro-financial products and services. FinTech is helping the MFIs to leverage on mobile money platforms and the internet to intensify cost efficient outreach efforts by offering a wide variety of financial services such as money transfers, micro-insurance, microleasing, diaspora remittances and foreign exchange transactions (besides deposits and loans) to urban, rural and marginalised populations. Having this background on the evolution of the microfinance sector in LISSA countries in mind, the following paragraphs discuss the roles of microfinance in LISSA which, inter alia, include: poverty reduction, financial inclusion and women empowerment.

i. Poverty Reduction

The percentages of people that survive on less than US$1.90 a day are very high amongst the LISSA countries as shown in Figure 2.1. Countries such as Burundi, Democratic Republic of Congo, Madagascar and Malawi have percentages which are 70 % and above. The high poverty rates in the LISSA countries are attributed to a plethora of macroeconomic factors that, inter alia, include: low GDP, high unemployment, limited financial access, high levels of inflation, high levels of public debt and negative current account balances (Bayai, 2017).

Furthermore, Abdulai (2017) noted that high levels of poverty in African countries are due to unfavourable business environments which result in low economic activity and ultimately choking economic growth which is one of the positive drivers of poverty alleviation measures. Comoros and Zimbabwe have low percentages of people surviving below the international poverty line as a result of experiencing economic growth (Nguyen, Dridi, Unsal and Willians, 2015). According to the World Bank (2017), the global rate of extreme poverty declined from 34.8 % in 1990 to 10.7 % in 2013 but extreme poverty is still very high in SSA particularly in the LICs due to rapid population growth. In 1990, the extreme poverty rate stood at 54.8 % and in 2013 it stood at 41 %. This statistic reflects that the African continent lagged behind in attaining one of the Millennium Development Goals (MGDs) of the United Nations of halving the extreme poverty rate by the year 2015 (United Nations, 2015).

Figure 2.1: Percentage population living below $1.90 a day in the LISSA countries



Source: Compiled by the author using data from the World Development Indicators[9]

The World Bank is optimistic that the extreme poverty rates in the LISSA countries will continue in double-digit figures by the year 2030 indicating that robust measures have to be taken to eradicate extreme poverty in these countries. Therefore, microfinance provision was incorporated in the SDGs as the primary solution to eradicate extreme poverty in LICs.

[9] The LISSA countries and their abbreviations are as follows: Benin-BEN, Burkina Faso-BFA, Burundi-BDI, Central African Republic-CAF, Chad-TCD, Comoros-COM, Congo, Democratic Republic-ZAR, Eritrea-ERI, Ethiopia-ETH, Gambia, The-GAM, Guinea-GIN, Guinea-Bissau-GNB, Liberia-LBR, Madagascar-MOZ, Niger-NER, Rwanda-RWA, Senegal-SEN, Sierra-Leone-SLE, Somalia-SOM, Tanzania-TZA, Togo-TGO, Uganda-UGA, Zimbabwe-ZWE.

The study of Van Rooyen, Steward and De Wet (2012) presented that over time, the impact of microfinance in SSA through the provision of microcredit and savings has produced positive impacts on the economic and social welfare of the urban and rural poor and low-income households thereby lessening the rate of poverty throughout the region. According to Hermes (2014), microfinance provision has also led to the reduction of income inequalities between the rich and the poor.

Despite the significant role that microfinance provision has played in the fight against poverty, the United Nations (2013, p. 6) stated that:

> "microfinance on its own is not a miracle solution to eradicate extreme poverty. … microfinance can deliver positive effects only when it is combined holistically and integrated effectively with other economic and social programmes to meet the diverse needs of the poor and help them form poverty".

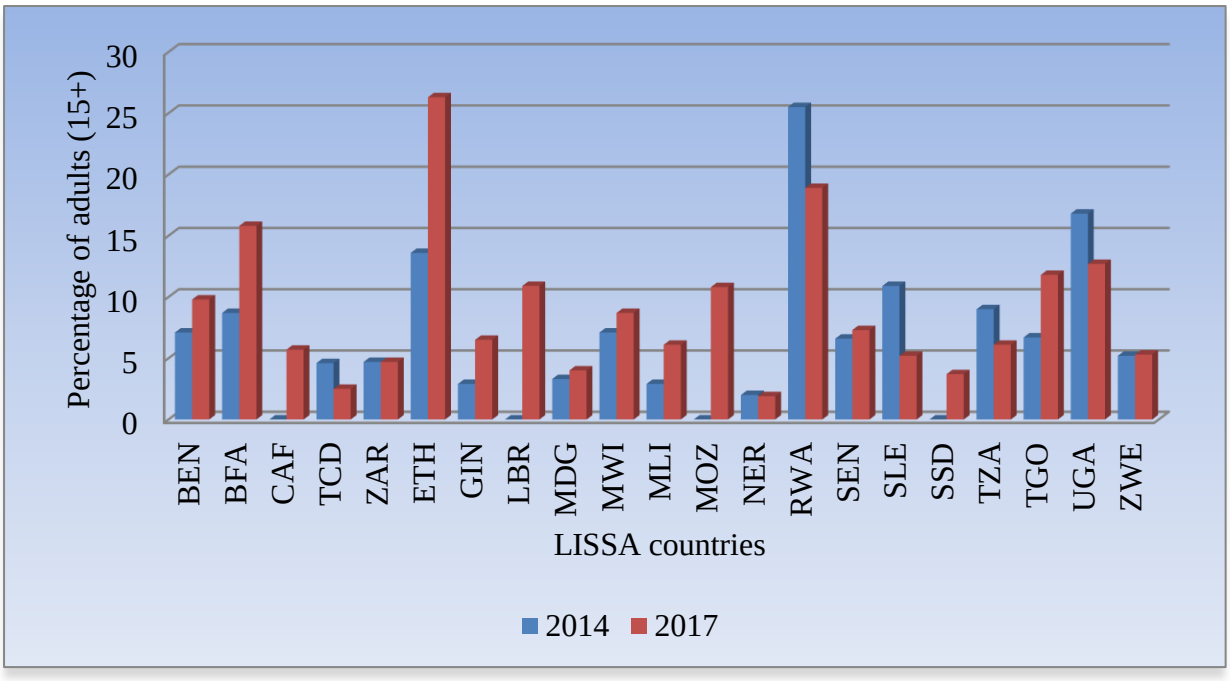
Several complementary policies and strategies therefore have also been adopted in the past decades to fight extreme poverty in the LISSA countries although the problem of extreme poverty persists. According to Handley, Higgins, Sharma, Bird and Cammack (2009), United Nations Report (2019) as well as the World Bank (2019a), the combined effect of different strategies and measures for alleviating poverty such as the Structural Adjustment Programmes (SAPs) in the 1980s and 1990s, Poverty Reduction Strategies (PRSs), Development Aid and the MDGs; led to the reduction of extreme poverty levels from 1.9 billion people in 1990 to 836 million people in 2015. This statistic shows that the fight against extreme poverty is a never-ending upward path as long as most of the residents in the LISSA countries still survive on less than US$1.90 a day. In considering the aforementioned poverty reduction tools, Musanganya, Nyinawumuntu and Nyirahogenima (2017, p. 81) argued that microfinance provision stands foremost as the "staple tool" for uprooting abject poverty in LISSA. Nonetheless, microfinance provision is not only a tool for poverty reduction but is also a tool for financial inclusion of the poor and low-income people which is discussed next.

ii. Financial Inclusion

The provision of microfinance has also played a pivotal role in promoting financial inclusion in the LISSA countries and other parts of the globe. According to Tita and Aziakpono (2017), financial inclusion ensures that financial institutions make financial products and services available and accessible to all people regardless of their level of income, gender and

location at an affordable cost. In assessing the levels of financial inclusion in the LISSA countries under study, financial inclusion was defined using the standard Global Findex Database measure, which is, the percentage of people who have access to financial services (savings or borrowings) from formal financial institutions (Demirgüç-Kunt, Leora, Dorothe, Saniya and Jake, 2018). Figures 2.2 and 2.3 illustrate the percentages of people who had financial access in the LISSA countries in 2014 and 2017. Figure 2.2 illustrates financial inclusion to be measured as the percentage of adults who saved in financial institutions. The statistics indicate that the percentage of adults who saved in financial institutions in the LISSA countries in 2014 and 2017 was extremely low, as more than 50 % of the LISSA population resides in the rural and marginalised areas which are beyond the reach of commercial banks.

Figure 2.2: Percentage of adults (15+ years) who saved at a financial institution in 2014 and 2017



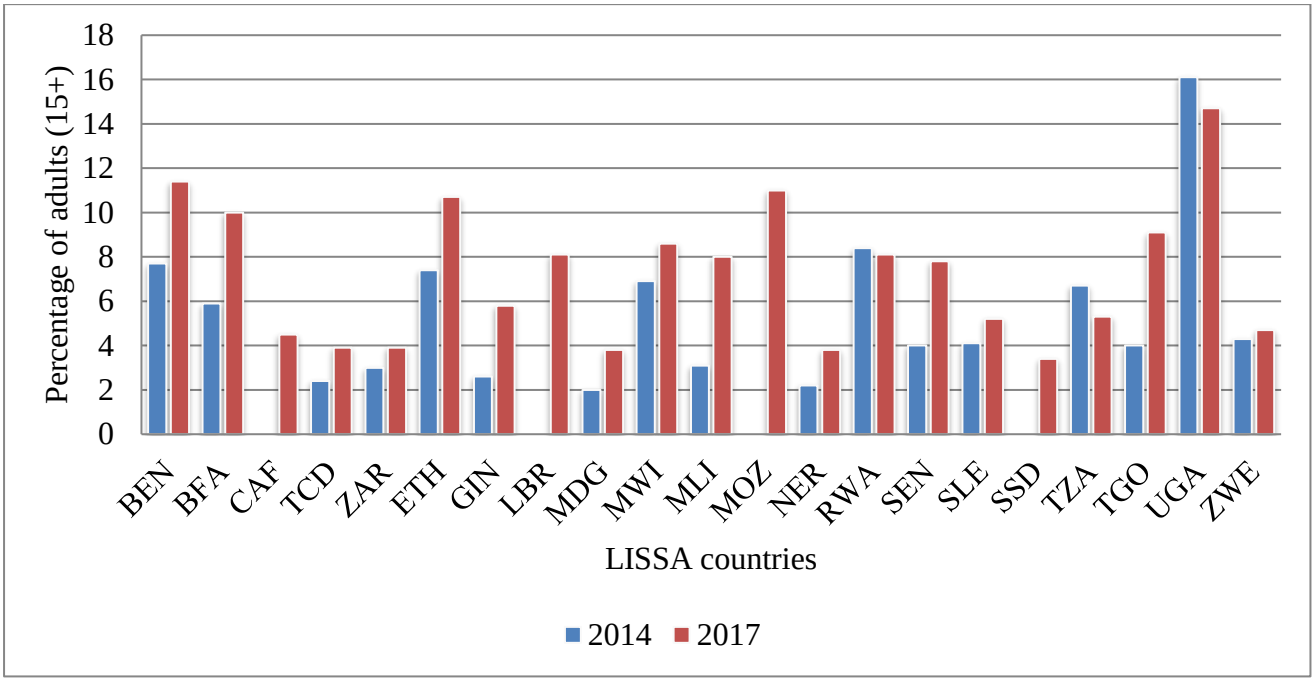
Source: Compiled by the author using data from the Global Findex Database

In 2014, the average percentage of people who saved at a financial institution across the LISSA countries as a whole was extremely low and averaged 6.6 %. In 2017, the average percentage for all the countries increased slightly to 8.8 %. Rwanda, Ethiopia and Uganda contributed more to the regional average as these countries recorded high percentages of people who saved in financial institutions in the year 2017. The slight increase in the percentage of savers between 2014 and 2017 is attributed to the development of banking or financial systems

across Africa (Bayai, 2017). Another contributing factor is the increase in financial literacy programs conducted mostly by MFIs to financially excluded populations which create awareness on the use of formal savings facilities for the poor and low-income households (Ndlovu, 2017). Access to formal savings facilities enables the poor and the low-income earners to smoothen their consumption patterns, be proactive in emergency situations, and to meet large expenditures such as paying dowry, wedding preparations and tertiary education. However, the 2017 regional average for the percentage of people who deposited their excess funds with financial institutions was pulled down by decreases recorded in Rwanda, Senegal, Tanzania and Uganda. Furthermore, Central African Republic, Liberia, Mozambique and South Sudan had the least percentages of people who saved in financial institutions.

Figure 2.3 illustrates financial access in LISSA countries in terms of borrowing from a financial institution for two comparative years, 2014 and 2017.

Figure 2.3: Percentage of adults (15+ years) who borrowed from a financial institution in 2014 and 2017



Source: Compiled by the author using data from the Global Findex Database

Figure 2.3 illustrates that there is a financial inclusion gap in the lines of credit that are advanced to the residents of the LISSA countries as the percentages of adults who borrowed from financial institutions in 2014 and 2017 were extremely low. On average, approximately 4.2 % and 7.2 % of the population aged 15+ in the LISSA countries managed to borrow from

a financial institution in 2014 and 2017, respectively. These statistics though extremely low, indicate an upward trend in the uptake of credit facilities. On the country level, almost all the countries recorded increases in the percentage of people who borrowed from financial institutions between 2014 and 2017 except for Rwanda and Uganda. This means that there was an improvement in the number of people that were financed by financial institutions. The study by Van Rooyen *et al.* (2012) demonstrated how access to credit facilities from MFIs has benefited vulnerable populations across African countries over time (refer to Section 2.2.i.). The decline in the formal borrowing trends in 2017 for Rwanda and Uganda was due to the high rate of borrowing from family or friends which stood at 42.9 % and 46.5 %, respectively (Demirgüç-Kunt *et al.*, 2018).

When the borrowing trends are compared with saving trends, the statistics show that the LISSA population saves more than it borrows, a phenomenon that Lafourcade *et al.* (2005) called the "African exception". This phenomenon is driven by factors such as central bank regulations that require DTMFIs to hold a larger percentage of their deposits as fractional reserves instead of intermediating them and that African MFIs have traditionally focussed on deposit products and services to encourage savings (Lafourcade *et al.*, 2005). This shows that a lot of work has to be done on the borrowing front to improve the current levels of financial access through loans. Microfinance regulators have, therefore, drafted national financial inclusion strategies that encourage the MFIs to play a significant role in increasing financial access in the LISSA countries as they are characterised by populations that are shunned by commercial banks due to their inaccessibility and lack of physical collateral security. Thus, inclusive MFIs are envisaged to uplift the economic lives of the poor and low-income households by enabling them to deposit their savings, access lines of credit, transfer funds and gain financial literacy (IMF, 2016b).

Advances in information and communication technologies are the driving forces which push the LISSA MFIs to be key players in the financial inclusion agenda. Innovations in the use of mobile phones for financial transactions has enabled the LISSA MFIs to reach out to their target clientele in urban, rural and marginalised areas particularly in Eastern Africa by replicating the Kenyan' M-Pesa, M-Shwari and M-Kopa mobile phone platforms. As a result, data from the Global Findex database shows that there was an increase in the percentage of people that used mobile money accounts between 2014 and 2017 in the LISSA countries. In Tanzania, M-Pawa, which was established in 2014, led to the creation of approximately 5 million accounts in 2016 and loans worth US$22 million were disbursed (GSMA, 2016).

According to the United Nations (2013), the mobile network operators are influencing the development of branchless banking in different parts of Africa. These include the notable M-PESA an affiliate of Vodaphone in Kenya, Orange Money in Côte d'Ivoire, Senegal and Mali, MTN Mobile in Ghana, Côte d'Ivoire and Benin and Zain Zap in Burundi. Besides poverty reduction and financial inclusion, the provision of microfinance is also a means to empower women in LISSA.

iii. Women Empowerment

The fifth Sustainable Development Goal of the United Nations aims to achieve gender equality and to empower all women and girls. According to the International Labour Organisation (ILO) (2018), the opportunities for work for women are less than those for men throughout the world and low female labour force participation rates leave many women vulnerable to poverty. In the same vein, the Women Thrive Worldwide (2018) estimated that in countries such as Benin, Burkina Faso, Mali and Niger, the poverty rate for women ranges between 48 and 65 per-cent and therefore concluded that, "poverty is gendered" across the LISSA countries. Hence, MFIs in the LISSA countries are vehicles that empower women through financial access following the success of the pioneer microfinance programs such as the Grameen model which mainly focused on lending to women. According to Van Rooyen *et al.* (2012), disbursement of microcredit coupled with training in microenterprise skills and business counselling to a group of men and women has led to the empowerment of women to improve their livelihoods in rural Uganda. In 2018, the Zimbabwean government established the Zimbabwe Women Microfinance Bank as a means to empower poor women through microfinance provision.

Microfinance provision is one of the key players in women empowerment due to several reasons. Firstly, women are more prone to suffering from life's unwanted misfortunes than men, therefore financial access enables them to fast track their lives out of such undesirables (Marr and Awaworyi, 2012). Secondly, focus on women than men in the provision of microfinance is part of the growing movement of increasing women's emancipation and gender equity. In many traditional African societies, women are unemployed, always at home and do not own assets that are considered bankable. Assets that are considered bankable are not registered in the names of women but the names of their husbands in most cases, indicating that it is difficult for them to access loans. Thirdly, women are more likely to use the loans that have been disbursed to them productively than men. Men are more prone to drunkenness and

other forms of abusing loaned funds whereas women are more likely to use the loans obtained to cater for the essentials of their families. Fourthly, credit risk management in both the banking and microfinance sectors has shown that women are more trustworthy clients in repaying loans than men, and this results in risk reduction, spurring liquidity and financial sustainability (Janda and Zetek, 2014).

Having outlined the role of microfinance provision in LISSA, a discussion on the macroeconomic fundamentals that have a bearing on the operations of the LISSA's microfinance sector in attaining financial sustainability, operating with adequate levels of liquidity and expanding outreach to the poorest in their large numbers through an array of financial services is important.

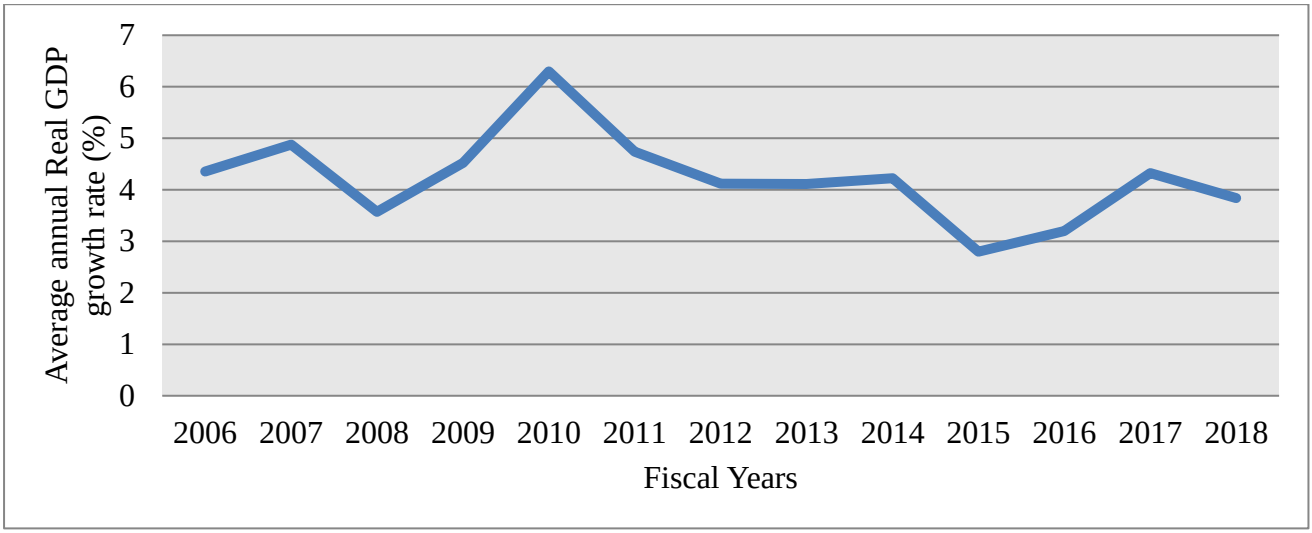
2.3 LISSA Economic Performance in Light of Microfinance

The success of the LISSA DTMFIs in terms of financial sustainability, liquidity and outreach and ultimately, poverty alleviation, is not only hinged on their ability to control their internal environment but also on stable macroeconomic conditions (Xu *et al.*, 2016; Caro, 2017; Churchill, 2019; Inekwe, 2019). In this realm, this section discusses the macroeconomic performance of the LISSA countries in light of the role and growth of the microfinance sector based on four macroeconomic fundamentals; real Gross Domestic Product (GDP) growth rate, inflation rate, domestic credit to the private sector as a percentage of the GDP and the level of informality.

2.3.1 Growth

Sub-Saharan Africa as a whole has been growing between 1990 and 2015, and growth has made the region to be integrated into the global economy and growth also catalyses poverty reduction schemes (Nguyen *et al.*, 2015). However, at a country level, growth in the real GDP has not been uniform across the SSA countries (Ndoricimpa, 2017). The average real GDP growth rate in the LISSA countries has been sluggish and fluctuating between 2006 and 2018 as indicated in Figure 2.4 thereby shrinking the progress towards poverty alleviation (Broadberry and Gardener, 2019), albeit rapid population growth (WDIs, 2017).

Figure 2.4: Average annual Real Gross Domestic Product percentage growth rate for the LISSA countries for the years 2006 to 2018



Source: Compiled by the author using data from the World Development Indicators

In the fiscal year 2006-7, the real GDP growth rate increased from 4.4 % to 4.9 % but there was a significant drop in 2008 due to the economic shocks of the global financial crisis (Zyuulu, 2010). Thereafter, there was a sharp revamp of the real GDP growth rate to a record high of 6.3 % in 2010 as the effects of the global financial crisis were levelling off and the increase in the level of foreign direct investments which was channelled into productive sectors (Iossifov and Khamis, 2009; Kamara, 2014). Between 2011 and 2015, the fall in the real GDP growth rate in LISSA was due to downward movements in commodity prices most particularly oil prices and the prevalence of drought in some parts of the region for some years (Horizon Africa Capital, 2017).

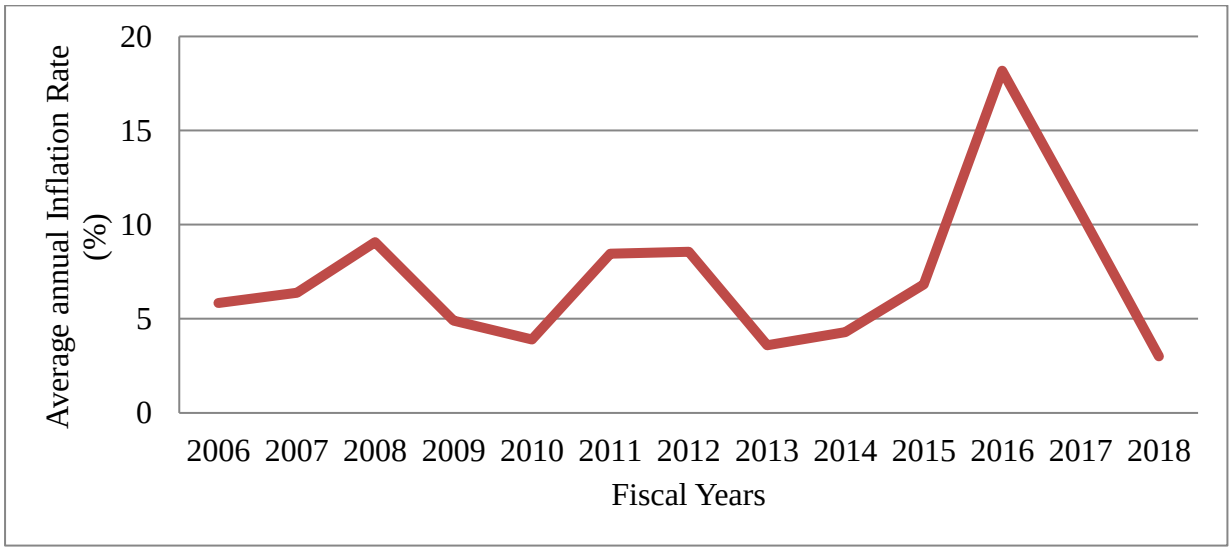
Improvements in commodity prices and increasing financial depth contributed to the upward movements of the real GDP growth rate in LISSA between 2016 and 2018 (IMF, 2016b; Mahonye, Marko and Anim, 2016; AfDB, 2018). Despite being slow, growth in the LISSA countries has produced spillover effects into the microfinance sector hence putting a check on growing poverty levels (Ikhide, 2015). Some DTMFIs have up-scaled their operations and have become fully-fledged commercial banks, for instance, two banking institutions in Uganda have their roots in microfinance. As a result of growth, the uptake of microloans has increased as the MSMEs require financing for boosting their operations to meet the growing demand for their products and services. Growth in the volume of the loan portfolio results in increased interest income thereby boosting financing sustainability (Imai, Gaiha, Thapa,

Annim and Gupta, 2011). However, growing loan portfolios may lead to larger loan balances which have been criticised as the drivers of mission drift (Ahlin *et al.*, 2011; Xu *et al.*, 2016). However, where growth has been moderate or negative due to unstable macroeconomic conditions, it has been blamed for stifling microfinance operations by dwindling sources of finance which cripple liquidity and the continued existence of the sector in putting a check on poverty (Lützenkirchen and Weistroffer, 2012). Also, growth decline causes repayment problems as the borrowers withhold payments trying to cope with the increased cost of living (Janda and Zetek, 2014).

2.3.2 Inflation

The rate of inflation is also another macroeconomic variable that has an impact on the stability of the economic environment, business operations and ultimately the poor and low-income households in the LISSA countries. Figure 2.5 shows the average inflation rate (measured using the Consumer Price Index (CPI)) for the LISSA countries between 2006 and 2018.

Figure 2.5: Average Inflation Rate for the LISSA countries for the years 2006 to 2018



Source: Compiled by the author using data from the World Development Indicators

As Figure 2.5 above shows, between 2006 and 2013, the average inflation rate[10] for the LISSA countries was fluctuating as a single-digit figure and was extremely low in 2006, 2009, 2010 and 2013, not exceeding 6 %, indicating that it was enhancing growth (Ndoricimpa,

[10] The average inflation rate excluded Zimbabwe during its hyperinflationary years, 2006 to 2009.

2017). One of the reasons for the single-digit average inflation figure is that some of the LISSA countries in Central Africa and Western Africa belong to the CFA Franc common monetary area[11] (see Figure 2.6) where the Franc is pegged against the Euro through a fixed exchange rate regime so as to insulate it from inflationary pressures. The sharp increase in the average inflation rate between 2014 and 2016 in the LISSA countries was ignited by the rise in the prices of basic food commodities which were very high, volatile and persistent due to "incomplete pass-through from world food and fuel prices and exchange rates to domestic food prices" (Alper, Hobdari and Uppal, 2016, p. 2). Furthermore, the sustained rise in food prices was caused by the occurrence of drought in East Africa in 2015 and 2016 (African Development Bank (AfDB), 2018). Similarly, commodity price shocks in oil-exporting countries such as Chad and South Sudan, exchange rate depreciations and widening fiscal deficits contributed to the sharp rise in the inflation rate to a double-digit figure of 18.2 % in 2016.

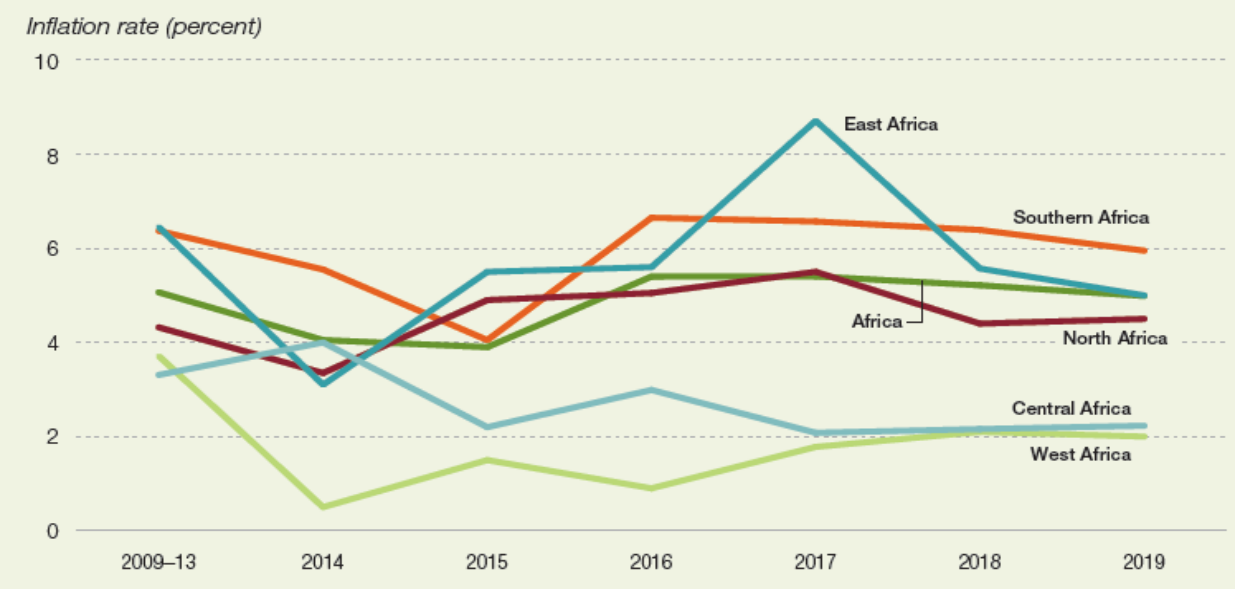
In 2017, the average inflation rate dropped sharply to 10.6 % and there was a further sharp drop to a single-digit figure of 3 % in 2018 as there was a marked improvement in harvests and commodity prices coupled with narrowing fiscal deficits. Thus, inflation has been a setback on the economic growth of the LISSA countries over time, especially where it has been above the threshold levels such as in the year 2016 thereby exerting pressure on the monetary authorities to put a check on the general price level (Ndoricimpa, 2017). Furthermore, inflation is a drawback on reducing poverty through microfinance provision as it leads to a reduction in the volumes of deposits and gross loan portfolios implying that inflation stifles outreach of the LISSA DTMFIs (Donou-Adonsou and Sylvester, 2016; Yimga, 2016).

During episodes of high inflation, deposits in the LISSA DTMFIs tend to be short-lived due to fear of loss in the purchasing power of money if they are withdrawn later thereby increasing the risk of early withdrawals which spiral deposit runs. Thus, inflation threatens the liquidity positions of the LISSA DTMFIs and also causes difficulties in loan collections as the borrowers deliberately delay in making payments. Intuitively, delayed payments also translate into high portfolio at risk ratios and high loan loss provisions meaning that profitability is eroded thereby reducing financial sustainability. Nevertheless, high inflation rates prompt the

[11] The CFA Franc zone includes Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Republic, Cote d'Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau, Mali, Niger, Senegal and Togo.

providers of microfinance to charge high lending rates which increase interest income for boosting profitability (Janda and Zetek, 2014) but profitability is eroded by the rising operational costs in so doing choking financial sustainability.

Figure 2.6: Median Inflation Rates in Africa and its Sub-regions between 2009 and 2019



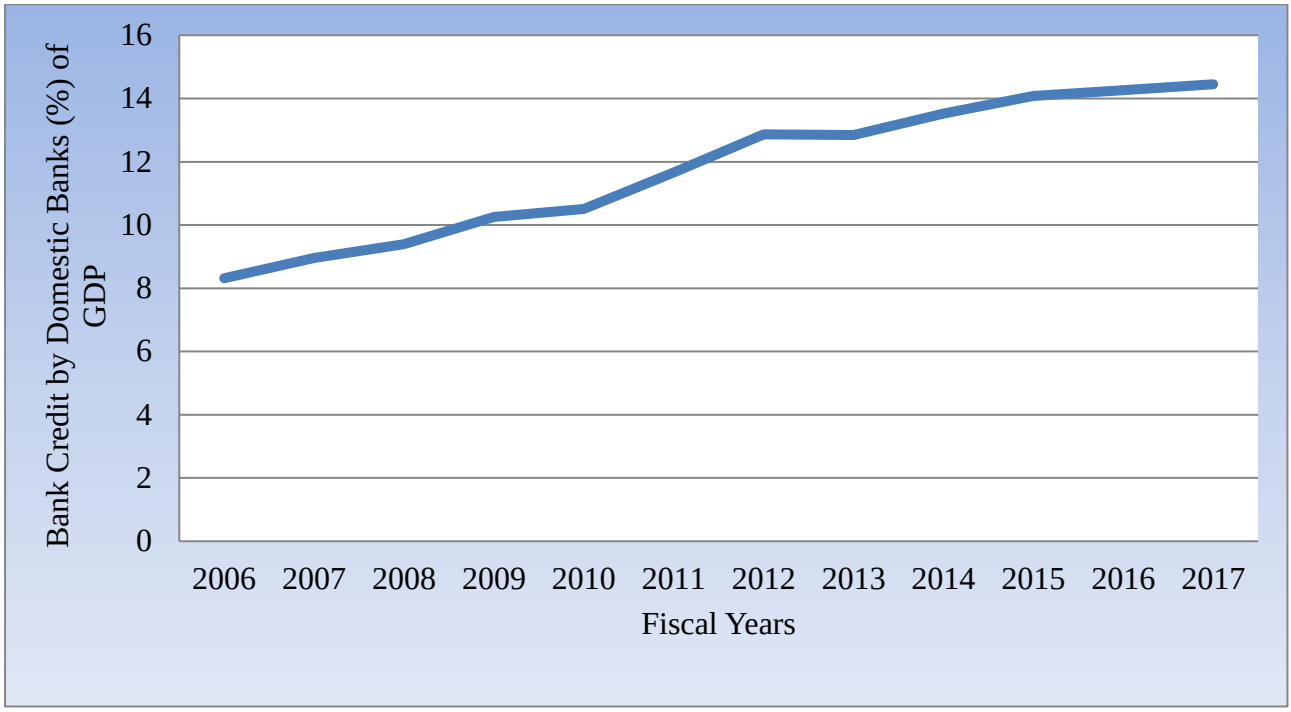
Source: Adapted from African Development Bank (2018, p. 15)

2.3.3 Domestic Credit to the Private Sector

The private sector is important in driving economic activities that result in economic growth in the LISSA countries (AfDB, 2018). In this realm, private sector credit[12] by domestic banking institutions is required to finance producers so as to enable them to even out the supply of goods and services which are needed for the well-being of economic agents. Figure 2.7 below shows the level of domestic bank credit to the private sector as a proportion of the GDP between 2006 and 2017 for the LISSA countries.

[12] Private sector credit refers to financial resources or payable claims such as loans, non-equity securities purchases, trade-credits and other accounts receivables to the private sector (Mahonye *et al.*, 2016).

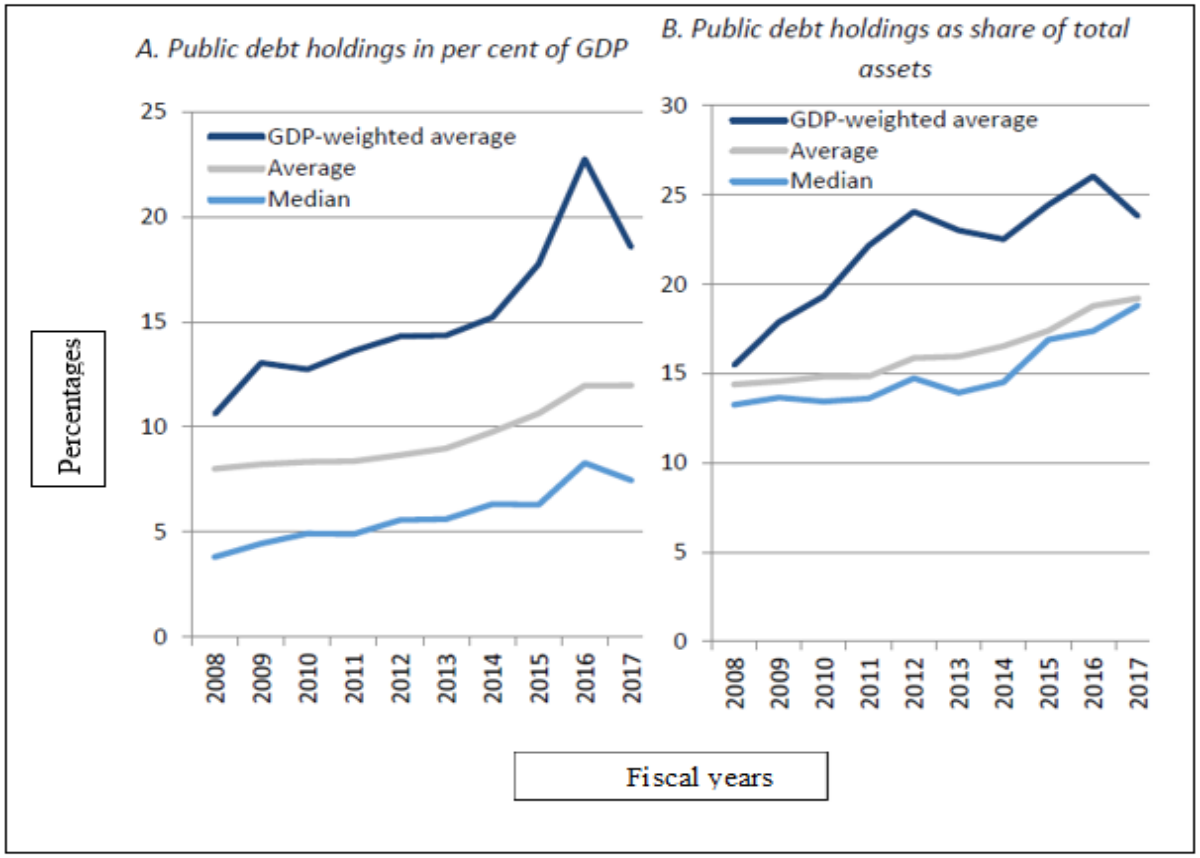
Figure 2.7: Domestic Credit to the Private Sector by Banks as a percentage of the GDP for the LISSA countries for the years 2006 to 2017



Source: Compiled by the author using data from the World Development Indicators

The average percentage of domestic credit to the private sector increased steadily from 8.3 % in 2006 to 14.4 % in 2017 indicating that financial development has been deepening in the LISSA countries but at a slower rate when compared to other world's regions (Ikhide, 2015; IMF, 2016b, Nguena *et al.*, 2016). The full potential of commercial banks to finance the private sector was pulled down by growing public debt holdings in banking institutions across all the African countries especially in Ghana, Niger, Tanzania and Zambia between 2014 and 2018. According to the European Investment Bank (2018), public debt holdings of African banking institutions stood at 8 % in 2008 and increased to 12 % in 2017. Furthermore, public debt constituted 19 % of the banks' assets in 2017 as compared to 14 % in 2008 as shown in Figure 2.8 below.

Figure 2.8: Public Debt Holdings of Banks in Sub-Saharan Africa



Source: Adapted from European Investment Bank (2018, p. 169)

Public debt is on the rise due to the high interest revenue earned on the sovereign paper which is attractive to domestic banking institutions and the limited presence of liquid bond markets in Africa (Bayai, 2017; European Investment Bank, 2018). Also, the banking institutions themselves now prefer to lend to the public sector than the private sector due to lack of adequate credit risk management infrastructure such as Credit Reference Bureaus in most of the LISSA countries in order to help them in assessing the risk profiles of the private sector deficit units. This has caused information asymmetry problems making enforcement of credit contracts to the private sector very difficult (IMF, 2016b).

Lending less to the private sector makes the LISSA banking institutions thwart the output from productive sectors such as the MSMEs thereby choking economic growth. In turn, the incomes of the poor and micro-entrepreneurs remain stagnant making it difficult for them to survive above the poverty datum line. Thus, low levels of domestic credit to the private sector in the LISSA countries have paved way for the MFIs to chip in and satisfy the unmet demand for loans for the poor households and the owners of MSMEs thereby leading to the

increase in the gross loan portfolio which earns interest income that boosts profitability and ultimately, financial sustainability (Janda and Zetek, 2014; Ikhide, 2015). The MSMEs benefit from the MFIs in the LISSA countries in the form of seed capital, working capital and order financing facilities. Thus, intervention of the MFIs in providing credit to the private sector has led to the integration of the microfinance sector into the financial system thereby increasing the depth of financial development in the LISSA countries (Sodikin and Donou-Adonsou, 2010). However, increasing financial depth means that the MFIs are now in direct competition with the banking institutions which improves efficiency and financial sustainability but this "would lead to lending with fewer restrictions and for greater amounts which in turn would lead the customers to greater indebtedness and therefore an increase in the rate of default" (Sainz-Fernandez, Torre-Olmo and López-Gutiérrez, 2015, p. 1062).

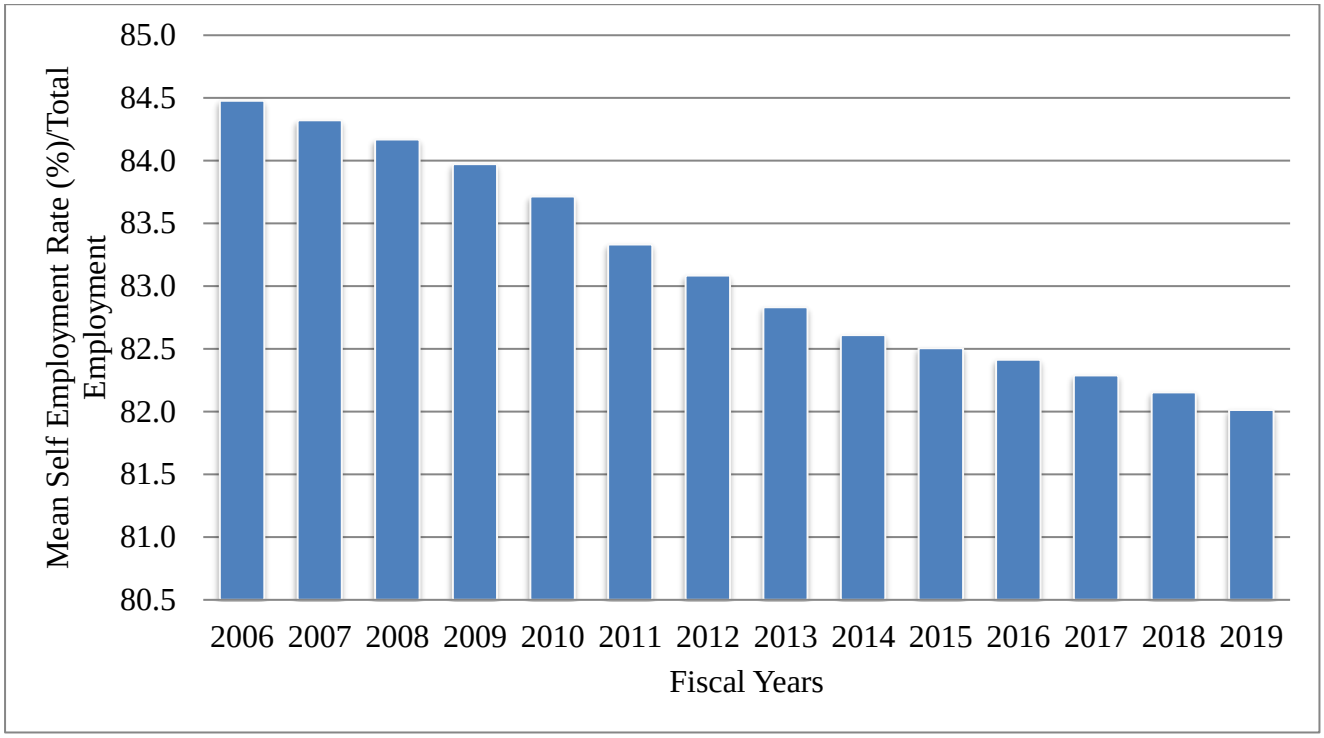
2.3.4 Informality

The level of informality[13] of businesses is extremely high in the LISSA countries. According to the International Labour Organisation (ILO) (2019), informality in the LISSA countries mainly consists of output informality and employment informality. Output informality accounts for about 40 % of the official GDP. In terms of employment informality, 9 out of 10 workers are informally employed, of which 6 are self-employed hence the high means shown in Figure 2.9.

Figure 2.9 below shows that there was a slight decrease in the average annual self-employment rate from 84.5 % in 2006 to 82 % in 2019, indicating that employment informality is very high in the LISSA countries. According to the World Bank (2019a), the decrease in the mean regional self-employment rate is attributed to substantial efforts that have been made in Ethiopia, Malawi, Rwanda and Tanzania in reducing both informal output and employment. However, the slow progress in decreasing the average employment informality rate of the LISSA countries is blamed on the high level of the self-employment rate in Benin, Burundi, Madagascar and Uganda where it is approximately 85 %.

[13] Informality discussed in this section refers to the informality of businesses not the informality of the microfinance sector as discussed in section 2.2.

Figure 2.9: Mean Self Employment Rate as a percentage of Total Employment for the LISSA countries between 2006 and 2019



Source: Compiled by the author using data from the World Development Indicators

The ILO reports that between 2010 and 2016, the level of employment informality was not the same across the sub-regions of SSA as it stood at 80 % in Western Africa, 68 % in Eastern Africa, 48 % in Central Africa and 43 % in Southern Africa. Drought episodes, redundancy during economic depressions, political upheavals, inheriting informal businesses, high dependence on agriculture, few opportunities in capital intensive businesses, social-religious factors that stifle women emancipation, low wage employment due to less education, skills and training and restrictive procedures and costs of registering formal businesses are the main culprits that force the LISSA residents to earn a living in the informal sector. The high level of informality in the LISSA countries mean that extreme poverty persists because the informal sector business owners do not all contribute to pension and social protection schemes. This indicates that upon injury, illness, retirement and death, the informal sector participants find themselves without funds for these life's claims. Also, the informal sector increases the levels of tax evasion meaning that the financial resources of the LISSA's governments are not realised as they should be thereby constraining their ability to finance the informal sector itself and other poverty reduction schemes (GSMA, 2017).

According to Ibrahim and Alagidede (2018), the high level of informality is also the cause of low financial development in the LISSA countries as banking institutions have been reluctant to lend to the sector due to perceived high credit risk. Intuitively, this means that the informal sector entrepreneurs are bailed out by MFIs as these financial institutions are better knowledgeable in lending to customers whose business operations generate low-profit levels and cash flows (Janda and Zetek, 2014). The MFIs in the LISSA countries also tend to thrive in dealing with the informal sector borrowers due to their flexibility in renegotiating the terms of credit when the informal sector borrowers face cash flow problems. The LISSA's microfinance sector also provides deposit facilities for the safe custody of the excess cash flows of the informal businesses and these businesses have contributed immensely to the phenomenal growth in deposits held by the LISSA DTMFIs as reported by the MIX. The complementary relationship between the informal sector and the microfinance sector has led some informal businesses to grow and upgrade to become formal businesses (Amsi, Ngare, Imo and Gachie, 2017).

The next section discusses the nature of deposits in the microfinance sector.

2.4 Deposits

2.4.1 Deposits in Microfinance

Rutherford (1999) observed that poor and low-income households have the capacity to save. Furthermore, Robinson (2004) as well as Ledgerwood, Earne and Nelson (2013) recorded that the savings by the low-income households exist either as formal or informal savings. Informal savings take the form of cash kept at home, agricultural products and minerals. The formal savings which are kept by DTMFIs are referred to as deposits[14] (CGAP/World Bank, 2005; Ledgerwood *et al.*, 2013). These formal or institutional savings in the form of deposits are preferable to informal or non-institutional savings because DTMFIs offer security, returns (interest income), varied forms of liquidating the savings, custom made deposit products and access to loans (Robinson, 2004; Helms, 2006). The deposits from the poor and low-income households are small in size when compared to commercial bank deposits, and exist either as compulsory savings or voluntary savings. Brom (2009) wrote that both compulsory and voluntary deposits come in the form of individual or group savings, lock-in or open access

[14] Formal savings in commercial banks and other banking institutions are also called deposits.

deposits. Izaguirre (2016) observed that due to the current digitalisation of financial products and services across the world, some deposits held by DTMFIs now exist in the form of digitally stored value products due to the rise of FinTech.

Compulsory or mandatory deposits are deposits that are mainly required by COMFIs from the poor and low-income households as cash collateral for microcredit. Thus, compulsory deposits are forced or tied to the loan agreements and hence they have been referred to as the "hidden collateral" of microcredit (Cozarenco, Hudon and Szafarz, 2016, p. 3). Compulsory savings are sometimes deposited with commercial banks by either the MFIs themselves or by the microcredit borrowers for safe custody (Karim *et al.*, 2011). In terms of accounting treatment, de Sousa-Shields and King (2005) noted that MFIs recognise compulsory deposits as cash and cash equivalents in their annual financial statements. Glisovic, Mesfin and Moretto (2012) noted that MFIs also determine the size, timing and liquidity of the compulsory savings. According to Robinson (2004), compulsory deposits do not earn any interest; they are deterrents in obtaining loans and not liquid unless the depositors forgo their right to borrow. Robinson also noted that there is no wide range of deposit products associated with compulsory deposits.

The empirical works of Christen, Lyman and Rosenberg (2003), de Sousa-Shields and King (2005) and Karim *et al.* (2011) noted that MFIs in different locations differ in the way they handle compulsory deposits. While some stakeholders contend that compulsory deposits cannot be intermediated (Simtowe, 2008), others argue that compulsory deposits can be intermediated (Robinson, 2004). de Sousa-Shields and King (2005) further reasoned that compulsory deposits can only be intermediated by supervised MFIs. Robinson (2004) wrote that the stakeholders who lobby for compulsory deposits in microfinance provision believe that the low-income households do not have financial discipline so they must be forced or taught how to save. Nonetheless, Karim *et al.* (2011) opined that COMFIs that require compulsory savings from their loan customers have two options; either discontinuing the practice or transforming into DTMFIs.

In terms of voluntary deposits, as the name suggests, microfinance clients deposit their savings voluntarily or willingly. According to Robinson (2004), the microdepositors have a savings background which encourages them to save in formal institutions and they do not need to be taught or forced to save. DTMFIs intermediate voluntary deposits into loan portfolios (Brom, 2009). Voluntary deposits are packaged in different forms (demand deposits,

contractual savings, time deposits and equity deposits) with varying levels of liquidity, and these different deposits earn varying levels of interest (CGAP/World Bank 2005; Glisovic *et al.*, 2012).

According to Robinson (2004, p. 9), the MFIs that collect deposits must follow 10 principles[15] which set the foundation for the way they are regulated and guided in deposit mobilisation activities. Of these principles, principle number 10 states that "certain basic preconditions are needed for mobilising voluntary savings". Under this principle, it is stated that wherever DTMFIs operate, there must be a reasonable policy and regulatory environment which is characterised by liberalisation of interest rates and appropriate regulations. Amongst the appropriate regulations are the liquidity ratios which guide how much of the deposits can be intermediated into loans. For instance, in Zimbabwe, the loans to deposits ratio and the prudential liquidity ratio are pegged at 70 % and 30 %, respectively (Reserve Bank of Zimbabwe (RBZ), 2020b).

Mobilisation of deposits in microfinance requires that the DTMFIs are regulated institutions implying that there are regulatory costs for complying with the rules and regulations set by the regulators (Cull *et al.*, 2009b). Additionally, there are some prerequisites that must be met before the deposit-taking institutions are allowed to attract deposits so that the process is conducted in a professional manner that bolsters depositor confidence and does not pose systemic risk. The preconditions mainly comprise of capital and revenue expenditures that must be incurred prior to commencing operations which inter alia include: risk and liquidity management strategies, internal control systems, infrastructural development, appropriate corporate governance structures, training and development needs and the ability to develop appropriate deposit products and other financial services for the target market. There should also be consistent financial viability in operating in the credit market before transforming to a deposit-taking institution. Another important precondition for attracting deposits is that there should be a conducive economic and political environment that encourages economic agents to store their savings in formal financial institutions (Robinson, 2004; Ledgerwood and White, 2006).

[15] A detailed description of the 10 basic principles for MFIs that collect savings from the public is found in Ledgerwood and White (2006) and Robinson (2004).

2.4.2 Deposit-taking Charter Types

The charter types which are the legal forms of ownership of the DTMFIs in the LISSA countries are: banks (BANKs), Non-bank Financial Institutions (NBFIs), Non-governmental Organizations (NGOs), Credit Unions and Co-operatives (CUCs) and Rural banks (RBs). The 2014 Global Outreach and Financial Performance Benchmark Report published by the MIX provides definitions of these varied charter types. BANKs are licenced financial institutions which are regulated by a state supervisory agency providing a wide array of financial services such as deposit-taking, lending, payment services and money transfers. CUCs are not-for-profit making member-based institutions that provide financial services such as lines of credit and deposit-taking to their members. Normally, these institutions are regulated by a regional or national co-operative council and not the main regulator of financial institutions in the country. The NBFIs replicate the BANKs' business models but are licensed and regulated separately from the BANKs. Compared to BANKs, the NBFIs have a restricted rage of financial services that they provide. The NGOs are registered as not-for-profit institutions under certain legal charters and are not regulated by the regulators of banking institutions. Usually, these institutions face stringent restrictions to engage in deposit-taking but they provide other financial services without the restraints. RBs focus on rural and peri-urban populations that are usually involved in agricultural activities.

These various charter types exhibit variations in terms of their mission, policies, business models, institutional and clientele scale and profit status (NBFIs and BANKs being profit making entities and the NGOs, CUCs and RBs being non-profit entities). However, there is a growing transition from not-for-profit to profit status due to commercialisation of microfinance programs in search for continued existence in serving the target clientele (MIX & CGAP, 2011). As indicated earlier in section 2.2, the concentration of the charter types varies across sub-regions and countries due to the various legal requirements and historical factors that underlie the development of microfinance provision in each location (McGeehan *et al.*, 2007; MIX and CGAP, 2011). NGOs which are socially oriented institutions infiltrated all institutions all the subregions since the 1980s; Central, Eastern, Southern and Western. CUCs are more dominant in Central, Eastern and Western Africa due to the loi Parmec microfinance law that prevailed between 1993 and 2007 and the pioneer co-operative institutions from Canada and France. Concentration of NBFIs in East Africa was induced by the quest for profitability and their proliferation across all the sub-regions was partly spearheaded by the

fusion of global companies such as Opportunity International and Procredit (MIX, 2007). Eastern and Western Africa has Africa's oldest and most regulated microfinance regulators (Lafourcade *et al.*, 2005). In Southern Africa, DTMFIs mainly consist of two types; the downscaling of commercial banks into microfinance provision, and the upscaling of NBFIs from being non-profit to profit making concerns (Karim *et al.*, 2011). The commercial banks that are involved in microfinance provision are those that have become aware that the economic agents that are at the bottom of the pyramid are bankable and profitable. The RBs or Community banks are mainly found in Ghana, Tanzania and Sierra Leone (United Nations, 2013).

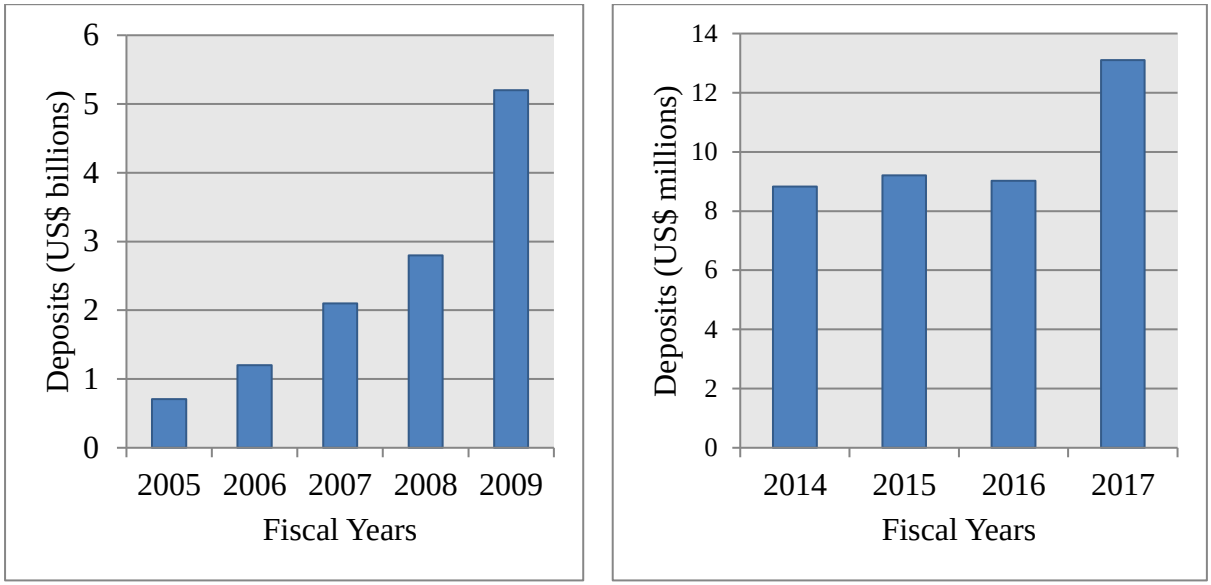
The different DTMFI charter types across the sub-regions have different outreach patterns (Lafourcade *et al.*, 2005). NGOs are pro-poor organizations and reach the poorest clientele in rural and marginalized areas with the smallest average loan balance per borrower. NGOs are less involved in deposit-taking as most governments forbid them to do so. Cooperatives particularly target the better-off poor who are salaried and reside in urban areas with high average loan balance per borrower and average deposit balance per depositor (MIX, 2007). Cooperatives are hailed for their ability to tap more deposits (MIX, 2006). Similarly, DTMFIs with a bank charter type focus more on the urban populations providing financial products and services of larger average balances (MIX & CGAP, 2008). The RBs are also instrumental in their outreach mission as they service about 2.3 million clients (United Nations, 2013).

2.4.3 Deposits in Sub-Saharan Africa: Contextualised Stylised Facts

The annual MIX financial and social performance reports show that deposit mobilisation is one of the prime activities in the microfinance sector of SSA. In the dawn of the 2000s, Lafourcade *et al.* (2005) noted that approximately 70 % of the MIX reporting MFIs from SSA were already actively involved in deposit-taking. As a result, it has been noted that exclusive to this region, the volumes of deposits[16] exceed the volumes of the gross loan portfolio (MIX and CGAP, 2013). Figure 2.10 below shows the volume of voluntary deposits that was mobilised by DTMFIs from SSA between 2005 and 2009 and between 2014 and 2017[17].

[16] Hereafter, the deposits refer to voluntary deposits, unless otherwise indicated.
[17] Deposits for the years 2010 to 2013 were not reported in the MIX and CGAP's annual reports for SSA.

Figure 2.10: Volume of Voluntary Deposits in Sub-Saharan Africa for some years between 2005 and 2017



Source: Compiled by the author using data from MIX and CGAP reports

As Figure 2.10 above shows, the high volume of deposits mobilised by the DTMFIs in SSA demonstrates that the poor and the low-income households have the capacity to save (Rutherford, 1999). In the year 2005, the volume of deposits from SSA DTMFIs stood at US$0.707 billion and grew sharply annually until 2009 where it reached a maximum of US$5.2 billion. Following this phenomenal growth in the volume of deposits in SSA between 2005 and 2009, SSA became the second leading world's region in terms of mobilising microfinance deposit volumes behind Latin America and the Caribbean. The MIX and the CGAP attribute this sharp growth of the deposit volumes in SSA to the influential role of co-operatives most particularly in West Africa and the proliferation of deposit focussed Greenfield MFIs in SSA (MIX, 2006; MIX and CGAP, 2012). In support of the annual growth rate in deposit volumes in SSA between 2005 and 2009, Basu *et al*. (2004) had earlier on attested that there was an increased appetite for deposits than microcredit in Africa. While the figures for deposits in Figure 2.10 for the years 2005 to 2009 are reported in US$ billions, the 2014, 2015, 2016 and 2017 MIX Benchmarking reports posted SSA deposit volumes in US$ millions.

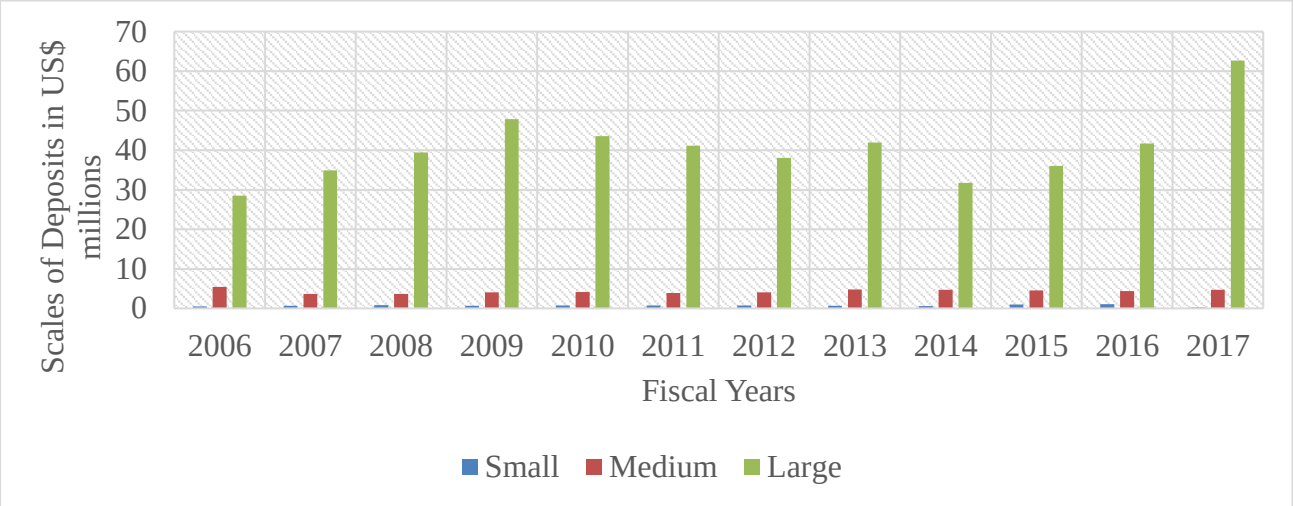
The drop in the absolute deposit volumes between 2014 and 2017 compared to the years between 2005 and 2009 in SSA was also experienced in other world's regions due to the reduced number of MFIs that reported their financial and social performance data to the MIX. In spite of this drop in absolute volumes of deposits, SSA remained the second largest world's

region in mobilising microdeposits based on data obtained from the MIX until the year 2015. In 2016, East Asia and Pacific and South Asia overtook SSA. In 2017, only the deposit volumes from the Latin America and the Caribbean and South Asia surpassed the deposit volumes of SSA. As deposits have been argued to be a means of attaining financial sustainability (Millson, 2013; Kaloo, 2015; Bayai and Ikhide, 2016a), financial sustainability is the next point of discussion.

i. Scales of Deposits in the LISSA countries

Figure 2.11 below shows the means of the scale of deposits spanning 2006 to 2017 for the sampled LISSA DTMFIs[18].

Figure 2.11: Mean Values of the Scales of Deposits for the sampled LISSA DTMFIs between the years 2006 and 2017



Source: Compiled by the author using data from the Microfinance Information Exchange

On an annual basis, small scale deposits were extremely low in terms of volume and exhibited slight variations over time when compared to the medium-scale and large-scale deposits. The medium-scale deposits were almost thrice greater than the small-scale deposits in each comparative year. The medium-scale deposits nearly exhibited a level trend over the years as slight variations were observed from one year to the next. Between 2006 and 2009, the volume of the large-scale deposits followed an upward trajectory. In spite of the anomaly

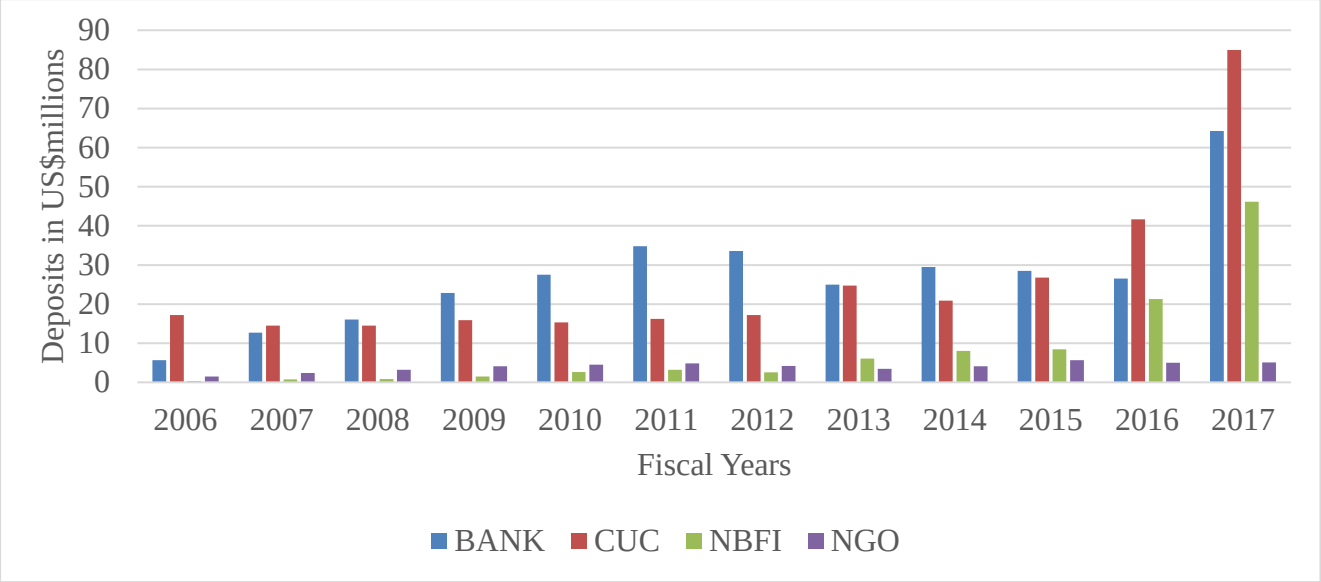
[18] Details on the sampled LISSA DTMFIs are discussed in Chapter four and Appendix 4.

in 2013, the large-scale deposits exhibited a downward trend between 2010 and 2014. As per the MIX's reports, this plunging of large-scale deposits volumes could be blamed on the decrease in the number of self-reporting financial service providers during this period (MIX, 2014; 2015; 2016). After 2014, the large-scale deposits followed an upward path until 2017 when they reached the highest average volume of US$62 677 544 ever since. On the contrary, the lowest volume of small-scale deposits of US$248 294 was recorded in that same year. Overall, it can be said that the large-scale deposits were dominant in the LISSA's depository microfinance sector during the entire period under consideration. In each relative year, the large-scale deposits far exceeded the volumes of both small scale and medium scale deposits combined many times, thereby explaining why deposit financing is principal in SSA as a whole (Bayai and Ikhide, 2016a).

ii. Scales of Deposits and Charter Type in the LISSA countries

Figure 2.12 below shows the average values of the LISSA DTMFIs' deposit volumes disaggregated by charter type. Of all the charter types, the NBFI-DTMFIs lagged behind in deposit mobilisation between the years 2006 and 2012, an indicator that these institutions did not have enough capacity to intensify their deposit mobilisation strategies. A change in this trend was observed as from the year 2013 when this lagging charter type surpassed the NGOs in terms of the mobilised deposits volumes till the year 2017. Most empirical writers state that the NGOs are largely restrained from mobilising deposits in many jurisdictions (D'Espallier *et al.*, 2017). However, throughout the entire period, the CUC-DTMFIs recorded steady growth in the volumes of deposits that they mobilised. As from the year 2015, the CUCs experienced a sharp increase of the deposit volumes as they reached their highest average of US$84 931 089 in 2017 outwitting their counterparts. This may be attributed to the fact that the CUCs rely on deposits for both investment and financing purposes.

Figure 2.12: Mean Values of the Deposits by Charter Type for the sampled LISSA DTMFIs between the years 2006 and 2017



Source: Compiled by the author using data from the Microfinance Information Exchange

The BANK-DTMFIs also experienced steady growth in the deposit volumes from 2006 to 2011 as evidence that most commercial banks were downscaling to include microfinance products and services during this period. Thereafter, the growth rate in the volumes of deposits mobilised by the BANKs was negative especially in 2013. However, in 2017 the deposit volumes of the BANKs skyrocketed to make the BANKs the second-largest charter type in terms of deposit mobilisation.

The next section discusses the concept of financial sustainability.

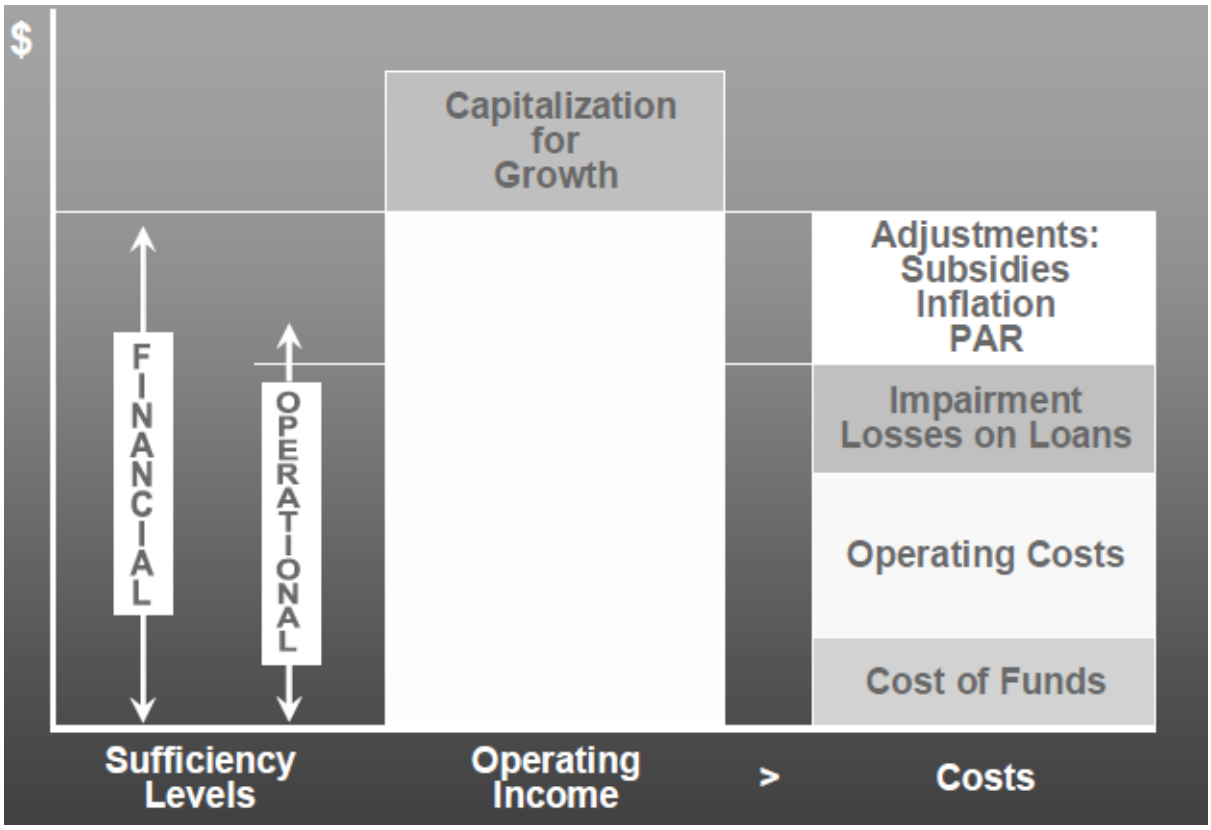
2.5 Financial Sustainability

2.5.1 Definition of Financial Sustainability

According to Rai and Rai (2012), the financial sustainability of MFIs is defined in multiple ways. Shaoyan and Duwal (2012) stated that financial sustainability is the ability of the MFIs to generate sufficient profits that cover their operational costs, loan losses and financial costs. The operational costs include transactional, personnel and administrative expenses while the non-operational expenses specifically include loan loss impairments and the finance costs which represent the interest paid to providers of finance and the interest paid on deposits. Johnson (2015, p. 123) defined financial sustainability as the "ability of an MFI to

achieve unsubsidised full cost recovery". Wafula *et al*. (2017) defined financial sustainability of MFIs in three stages; the survival stage where the MFIs struggle in meeting their costs; the sustainability stage where the use of wholesale funds and subsidies is envisaged to cover the costs; and the self-sufficiency stage where the financial revenue earned covers the costs. The self-sufficiency stage of the financial sustainability of MFIs focuses on the financial viability of the MFIs through computation and analysis of self-sufficiency levels as shown in Figure 2.13 below; Operational Self-Sufficiency (OSS) and Financial Self-Sufficiency (FSS).

Figure 2.13: Self-Sufficiency Levels



Source: Adapted from CGAP/World Bank (2009, p. 409)

According to the CGAP/World Bank (2009), while both the operational self-sufficiency and financial self-sufficiency measures cover loan loss provisions, operating expenses and financing costs from operating income, financial self-sufficiency is different from the operational self-sufficiency as it makes adjustments for costs associated with subsidies, the general price level and the portfolio at risk. Furthermore, Bogan (2012) noted that operational self-sufficiency is when the self-sufficiency ratio is 100 % or more, but once the 110 % threshold is surpassed, it becomes financial self-sufficiency. However, regardless of how

financial sustainability is defined, microfinance stakeholders concur that financial sustainability of MFIs is fundamental for achieving their objectives and their success (Anyawu, 2004; Gobezie, 2009; Huq *et al.,* 2017).

2.5.2 Financial Sustainability and its Importance

The world witnessed a paradigm shift in microfinance provision since the 1980s as the grand theme became the 'sustainability of the MFIs' (Hermes and Lensink, 2007; Cull *et al.*, 2009a). As noted in the background of the present study (section 1.1), the focus on financial sustainability was prompted by the commercialisation drive as MFIs sought to operate financially viable institutions by shifting from subsidised financing to non-subsidised financing (Ledgerwood and White, 2006; Lützenkirchen and Weistroffer, 2012). Khandker *et al.* (1995) cited in Rai and Rai (2012) wrote that sustainability in the microfinance sector is broken down into four themes; financial, economic, institutional and borrower. Of these four forms of sustainability, financial sustainability has been the major point of discussion in the field of microfinance (Woller, Dunford and Woodworth, 1999; Mersland and Strøm, 2010, Abdulai, 2017), and Wafula, Mutua and Museiga (2017) noted that financial sustainability is positively associated with institutional sustainability.

The level of success attributed to financial sustainability varies across the MFIs (Ahlin *et al.,* 2011). Therefore, Kinde (2012) considered financial sustainability as an ingredient for the livelihood of MFIs while Gashayie and Singh (2015) regarded financial sustainability as an indispensable condition for institutional sustainability of MFIs. Working towards achieving financial sustainability has been identified by microfinance empirics as one of the 'best practices' adopted by MFIs across the world (Woller *et al.*, 1999; Morduch, 2000; Tucker, 2001, Bassem, 2009). This is anchored on the fact that attaining financial sustainability ensures that the poor and low-income households benefit from consuming microfinance services continually rather than for a snapshot as the MFIs live long (Meyer, 2002; Helms, 2006; Rai and Rai, 2012). In support of this fact, (Tucker, 2001, p. 107) reasoned that attaining financial sustainability is "a necessity for most if not all MFIs" while Bassem (2009) and Agarwal and Sinha (2010) argued that accomplishing financial sustainability should be part of the corporate governance goals and objectives of the MFIs. This entails that attaining financial sustainability has several benefits for MFIs.

Sustainable MFIs are attractive to microfinance stakeholders, primarily the investors and donors (Shaoyan and Duwal, 2012). Financial sustainable MFIs have also been considered

as superior vehicles in the fight against poverty (Morduch, 2000). This is why Otero (1999) argued that, in and of itself, financial sustainability of MFIs is not an end, but a means to an end, that is, the long term efficient and profitable means of deepening and broadening outreach to the poor. Barbosha (2013, p. 24) argued that pursuing financial sustainability makes the MFIs to "perform goodly for their sustenance than reliance on external providers of finance". Bayai (2017) opined that financial sustainable MFIs are readily integrated into the financial system thereby deepening financial development. Inspite of these merits of financial sustainability, Bayai and Ikhide (2016a) noticed that financial sustainability varies with locations due to several factors as noted by Gashayie and Singh (2015) in Table 2.1

Table 2.1: Factors affecting Financial Sustainability in the Microfinance Sector

MFI related factor			**Borrower related variable**	**Macroeconomic related variable**
Breadth of Outreach	Staff productivity	Age of Microfinance Institutiion	Cost per borrower	Per capita income
Depth of outreach	Portfolio at risk	Capital structure	Number of active borrowers	Interest rate
Deposit mobilization	Loans intensity	Yield	Women borrowers	Competition
Management efficiency	Size	Operating expense/loan portfolio	Group lending	Degree of economic freedom

Source: Adapted from Gashayie and Singh (2015, p. 227)

According to Gashayie and Singh (2015), there are three categories of factors that affect the financial sustainability of MFIs. Some are MFI-related, others are clientele-related and some are macroeconomic related. Of these three different categories of factors that affect financial sustainability in the microfinance sector, Kinde (2012, p. 1) observed that some "have been found to be significant in one economy or applicable to a set of MFIs, some are not significant". Despite the widely acclaimed drive towards achieving financial sustainability (Quayes, 2012), most MFIs struggle to attain this goal (Agarwal and Sinha, 2010; Kinde, 2012). In amplifying this point, Vanroose and D'Espallier (2013) wrote that MFIs across the globe have achieved financial sustainability unevenly. This indicates that as the MFIs age, grow and differentiate their market segments, financial sustainability may be achieved or not depending on how the MFIs manage the internal and external factors. MFIs such as the Grameen Bank in Bangladesh and the Bank Rakyat Indonesia, amongst a few, have recorded success stories on financial sustainability and growth in the number of clientele served. Of the unsustainable MFIs, Kinde (2012) identified two sets; firstly, MFIs that operate at a loss with unsatisfactory

financial performance and secondly, MFIs that operate at a profit but part of their operations are subsidised. Ditcher and Harper (2007) estimated that out of the approximately 10 000 MFIs that were operational in the year 2007 across the world, only 3 to 5 % had attained full financial sustainability. Rosenberg *et al.* (2013) augmented this estimation and stated that MFIs with annual reported losses of 5 % are unsustainable. The microfinance sector in the LISSA countries also falls short in attaining financial sustainability despite having cheap deposit financing and that the drive towards achieving financial sustainability is mostly rampant in Africa and Asia than in any other part of the world (Ek, 2011).

As mentioned in the background of the study in section 1.1, several DTMFIs in the eastern, central and western sub-regions of LISSA struggled to attain financial sustainability between the years 2001 and 2011; Benin, 2; Burkina Faso, 1; Mali, 3; Niger, 2 and Togo, 3; (Riquet and Poursat, 2013). Boateng *et al.*, (2016) gave a record of 50 DTMFIs that collapsed in Ghana in 2013 due to lack of financial sustainability. Karim *et al.* (2011) also noted that both DTMFIs and COMFIs in Southern Africa struggled to achieve financial sustainability between the years 2000 and 2010 as their OSS ratio averaged 87.7 %. In Zimbabwe, failure to attain financial sustainability led to the massive deregistration of MFIs from 1600 in 2003 to 150 in 2013 (Chikoko and Kwenda, 2013; Dube and Matanda, 2015). Thus, attaining financial sustainability is a major cause for concern across the universal microfinance sector, especially in the LISSA countries where the MFIs have to operate continuously so that extreme poverty is eradicated through access to financial services.

It is also noted that the microfinance sector in the LISSA countries does not only strive to attain financial sustainability but also strives to operate with adequate levels of liquidity. Financial sustainability looks at the long-term financial performance of the microfinance sector in serving the poor but for the sector to perform in the long term, it must first perform goodly in the short term as measured by their ability to operate with optimal levels of liquidity. Therefore, the next section focuses on liquidity.

2.6 Liquidity

2.6.1 Definition of Liquidity

Goodhart in Guathier (2011, p. 7) stated that "the word liquidity has so many facets that it is often counter-productive to use it without further and closer definition". In light of this statement, various scholars concur that liquidity in the microfinance sector refers to the ability

of the MFIs to hold adequate levels of cash reserves in meeting their short term contractual and operational obligations (CGAP/World Bank, 2009; Tulchin, Sassman and Wolkomin, 2009; Parisetti and Kirimkan, 2015; Diar, 2017). As noted by Nanda (2016), short term refers to a period of one year or less. Maxwell *et al.* (2018) argued that liquidity is the prerequisite for DTMFIs to be able to cover the needs of their existing and potential clients; depositors' withdrawals, interest on deposits and loan disbursements. Intuitively, this means that liquidity is also essential for meeting the short-term needs of the institutions themselves which are either operational or financial (CGAP, 2009; Mata, 2011). This is premised on the fact that the ability of MFIs to meet short term obligations is directly linked to their working capital policies (Nanda, 2016; Mucheru, Shukla and Kibachia, 2017). Besides meeting the short term financial and operational obligations, some researchers have added that liquidity in microfinance provision also embraces the marketability of the financial instruments traded by the MFIs in the financial markets (Ogol, 2011; Murage and Muriu, 2016). In a quest to boost their liquidity, MFIs have become active in the capital markets since the initial public offering (IPO) of Banco Compartamos of Mexico in 2007 which marked a paradigm shift in the financing structure of MFIs. However, this financing initiative was not so gladly welcomed by the advocates of the Welfarist theory (Cull *et al.,* 2009a).

2.6.2 Measurement of Liquidity

Liquidity in the microfinance sector is measured in two ways (Gietzen, 2017). Firstly, static measures which are mainly financial ratios capture the liquidity state of MFIs at a particular point in time. Researchers in existing microfinance literature used different proxies for measuring liquidity in their studies; the savings liquidity ratio (Tulchin *et al.,* 2009), the gross loans and advances to customer deposits (Bichanga, 2016), the non-earning liquid assets to gross loan portfolio (Tehulu, 2016), the current ratio and the quick ratio (CGAP, 2009; Nanda, 2016; Mamathi *et al.*, 2017). The MIX uses the non-earning liquid assets to total assets (NELATA) ratio as the proxy for measuring liquidity. Based on these varied liquidity ratios, percentage benchmarks have been set by different microfinance regulators as a gauge for determining sufficient liquidity of MFIs. A study by Murage and Muriu (2016) which measured liquidity as cash and cash equivalents divided by total assets stated that the benchmark liquidity level for DTMFIs in Kenya is 20 %. At a technical training on risk management, the Asian Development Bank (ADB) (2011) also confirmed the 20 % benchmark liquidity rate for Vietnam MFIs.

According to the ADB (2011), the liquidity rate is computed as cash plus deposits plus securities divided by compulsory plus voluntary savings. Tucker (2001, p. 119) wrote that liquidity:

> … "should not be above or below the benchmark performance band of 10 % to 25 %. Too much liquidity means assets are not being loaned out, and too little poses the institution in danger of failing to meet pending obligations".

With so many financial ratios for measuring liquidity in the microfinance sector, Bruett (2004, p. 4) argued that the main limitation of these static measures of liquidity is that "financial ratios capture a moment in time past rather than a movement of cash in the future". Kar and Swain (2014) strengthened this point by arguing that ratios have distortions if they are not prepared using the widely accepted accounting standards. These shortcomings of static measures paved the way for the active measures of liquidity.

Various researchers argue that active measures of liquidity require setting up of Asset and Liability Committees (ALCOs) that match the maturities of different assets and liabilities (Bruett, 2004; Ogol, 2011; Sam, 2015). Through matching, liquidity gaps are identified and covered systematically. Even so, there are contrasting views on asset and liability management in depository microfinance. On the one hand, some empirics argue that DTMFIs mismatch the maturities of their assets and liabilities by transforming short term liabilities (short-term deposits) into long term assets (long-term loans) thereby exposing themselves to liquidity risk (Bruett, 2004; Mata, 2011; Ogol, 2011; Mucheru *et al.*, 2018). On the other hand, Gietzen (2017) argued that DTMFIs transform short-term deposits into short-term loans thereby eliminating liquidity risk.

In making use of both static and active measures of liquidity, DTMFIs have to be cautious to establish and maintain optimal levels of liquidity. Optimal levels of liquidity are neither too high nor too low (ADB, 2011) but are adequate to keep the DTMFIs operational with little exposure to liquidity risk. Having too much liquidity may seem desirable while having too little liquidity is undesirable. Murage and Muriu (2016) pointed out that with high liquidity levels, DTMFIs can offset their short-term obligations with ease, seize investment opportunities and diversify their loan portfolios. On the contrary, Tehulu (2016) argued that with high liquidity levels, the DTMFIs in diversifying their market segments catalyse credit risk through less stringent credit policies that may target defaulting clients. Conversely, low liquidity levels endanger the DTMFIs by incapacitating them in paying their outstanding

obligations (Nanda, 2016) thereby destroying their reputation (Anh and Tam, 2013; Sam, 2015; Klomp, 2018). Therefore, a trade-off exists in the measurement and management of liquidity in the microfinance sector. However, as explained in the discussion on the relationship between liquidity and deposit insurance throughout the study, the study adopted a liquidity management approach because deposit insurance protection is one of the measures of mitigating liquidity risk in the mainstream banking system for ailing deposit-taking institutions (Ngalawa, 2012).

2.6.3 Sources of Liquidity

Numerous avenues for liquidity in the microfinance sector are available. Deposits are viewed as the lifeline of the financial intermediaries that are involved in deposit-taking (Omino, 2005; Ndambu, 2011; Millson, 2013; Mucheru *et al*., 2017). Besides deposit-taking, other sources of liquidity for DTMFIs, inter alia, include: capital market funding, grants, donations, borrowings from commercial banks, central bank borrowings, borrowings from development banks, facilities from institutions that provide wholesale funds, MIVs and diaspora remittances (Cull *et al.*, 2009a; Mata, 2011; Glisovic *et al*., 2012; Parisetti and Kirimkan, 2015; Mucheru *et al.*, 2017).

2.6.4 Demand and Supply of Liquidity

Table 2.2 below shows that depositors and the DTMFIs are both involved in the demand and supply liquidity chain in depository microfinance.

Table 2.2: Demand and Supply of Liquidity in Depository Microfinance

	Demand for Liquidity	Supply of Liquidity
Depositors	Loans obtainable (cash inflow)	Loans repayable with interest (cash outflow)
DTMFIs	Paying withdrawals on deposits with interest (cash outflow)	Deposit mobilisation (cash inflow)

Source: Compiled by the author based on literature review

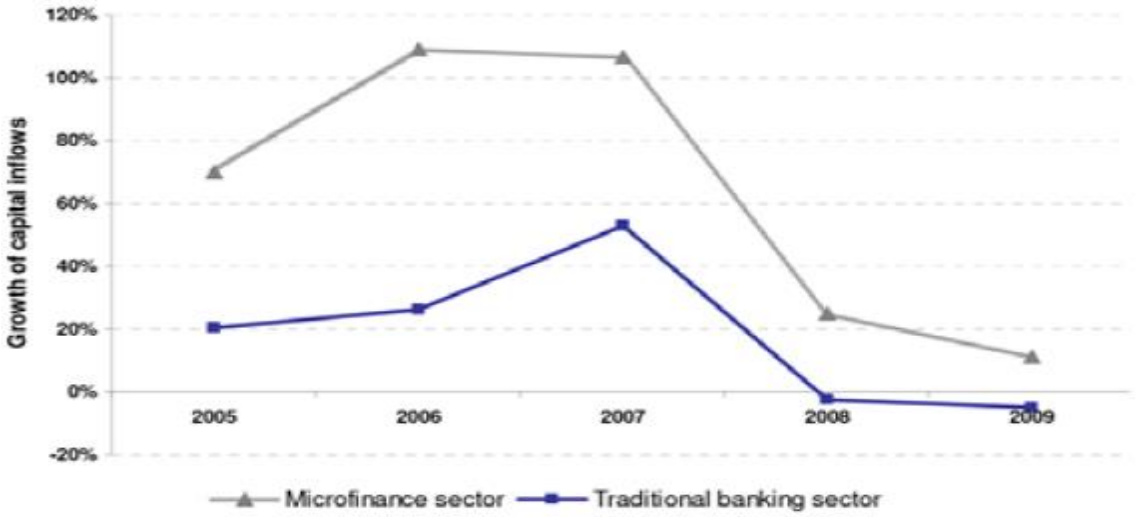
In depository microfinance, loans obtainable are considered as the demand for liquidity by depositors (cash inflow to depositors) while loans repayable with interest are considered as the supply of liquidity (cash outflow from depositors and or borrowers). Likewise, paying

withdrawals on deposits with interest is regarded as the demand for liquidity from DTMFIs (cash outflow from DTMFIs) while mobilising deposits from the poor and low-income households is regarded as the supply of liquidity to DTMFIs (cash inflow to DTMFIs).

Empirical literature points out several factors that influence the demand and supply of liquidity in operating DTMFIs. Mata (2011) noted that abrupt withdrawals and irregular loan disbursements impact the demand for liquidity negatively, while Ogol (2011) stated that the supply of liquidity is positively influenced by frequent, timeous and full loan repayments and effective deposit mobilisation. Furthermore, Ogol (2011) blamed the inability to source external funds especially during times of crisis as a strain to the liquidity of MFIs. Thus, the global financial crisis of 2008 not only had a negative impact on the global banking sector (Mucheru *et al*., 2017), but also constrained the liquidity of the global microfinance sector (Gauthier, 2011; Mata, 2011; Ogol, 2011; Kimathi *et al*., 2015).

Figure 2.14 shows trends in the flow of funds to MFIs and the banking sector on a global scale between the years 2005 and 2009.

Figure 2.14: Flow of Funds to the Global Microfinance Sector and the Banking Sector between the years 2005 and 2009



Source: Adapted from International Finance Corporation (IFC) (2013, p. 7)

As Figure 2.14 above shows, between the years 2005 and 2006, both the MFIs and banks recorded positive growth in capital inflows. The steep increase in the flow of funds to MFIs in 2007 in their quest for financial sustainability can be partially attributed to their

engagement in the capital markets (Cull *et al.*, 2009a). Another reason could be that following the receipt of the Nobel Peace Prize by Professor Muhummad Yunus and his Grameen Bank in 2006, it is reasonable to assume that investors poured in funds into the microfinance sector globally. Additionally, the MIX reports that during this period, Greenfield Institutions were spreading their wings globally thereby injecting funds into the microfinance sector worldwide (MIX and CGAP, 2012). Regrettably, both the MFIs and the traditional banks recorded negative growth in the flow of funds after 2007. The traditional banking sector experienced a descent in the flow of capital in 2008 and 2009 from a peak of more than 100 % in 2007, while the flow of funds to the microfinance sector diminished from a peak of approximately 55 % in 2007 to below 0 % in 2008 and 2009. Therefore, the study of Ogol (2011) supported by the ADB (2011), Anh and Tam (2013) and Sam (2015) all contend that failure to balance the demand and supply of funds stifles liquidity of the microfinance industry.

According to Nanda (2016, p. 38), "the highest concern of all microfinance institutions is that of liquidity because of the MFI operations' growing size which makes liquidity a regional economic issue of importance". In the same vein, Gietzen (2017, p. 121) added that "liquidity risk exposure ultimately remains an empirical question because deposit-taking MFIs have recently increased their share of funding from deposits". It is in this regard that Abakaeva and Glisovic-Mezieres (2009), Brom (2012), Nandi (2016) and Maxwell *et al.* (2018) opined that it is therefore crucial for MFIs, both DTMFIs and COMFIs, to hedge against liquidity risk exposure. This is accomplished by devising and implementing appropriate liquidity risk management strategies and contingency plans as required by principle number 14 of the 2010 Basel Committee on Banking Supervision (BCBS). Inspite of all these concerns, liquidity risk exposure of DTMFIs is prevalent amongst the LISSA countries as deposit insurance schemes for the protection of the voluntary deposits are non-existent in most parts (Mecagni *et al.*, 2015). Moreover, deposit protection through adherence to the Capital Adequacy Standards of the Basel Committee is also very minimal in the LISSA region (Mecagni *et al.*, 2015; Gietzen, 2017). Hence, the next section discusses liquidity in the context of deposit protection.

2.6.5 Deposit Protection in Low Income Sub-Saharan Africa: A Contextualised View

In line with the phenomenal growth in the volume of voluntary deposits and the number of voluntary depositors in SSA's microfinance sector which was described as the 'African exception' in section 2.2.iii above, prudential regulation of DTMFIs (Christen *et al*., 2003;

Lafourcade *et al.*, 2005; Bogan, 2012; Riquet and Poursat, 2013) and deposit insurance schemes are inevitable (Demirgüç-Kunt *et al.*, 2015; Izaguirre, 2016).

i. Prudential Regulation

According to Cull *et al*. (2009b) supported by Tchakoute-Tchuigoua (2016), prudential regulation is at the helm of MFIs that mobilise deposits from the poor and low-income earners. Prudential regulation guards against widespread failure of the financial system due to insolvency of one or more of the DTMFIs thereby protecting depositors' savings (Christen *et al*., 2003; CGAP, 2012). Low-income depositors cannot assess the financial soundness of the institutions that are the custodians of their hard-earned microsavings, hence a financial authority has to monitor these institutions on their behalf. Following the folding up of illiquid MFIs in the southern parts of SSA, Karim *et al.* (2011) stressed the importance of prudential regulation in protecting deposits held by the DTMFIs. Amongst the prudential regulation requirements for deposit protection are capital adequacy standards (IFC, 2013).

Adherence to capital adequacy standards prescribed by the Basel Accords is one of the means of protecting deposits from the poor and low-income households. According to the Basel framework, DTMFIs are encouraged to compute and maintain a prudential capital adequacy ratio using either the Standardised or Simplified Approach to gauge how they can settle their obligations and deal with losses (BCBS, 2010; Berger, 2010). Concerning the capital adequacy ratio of DTMFIs, Brady (2017) wrote that the capital adequacy ratio compares tier 1 capital and restricted tier 2 core capital to the risk-weighted assets of the DTMFIs. Tier 1 capital consists of core equity capital while tier 2 capital consists of general reserves and subordinated term debt. The earlier work on capital adequacy by Staschen (2003) stated that by correlating different capital components with varied risk weights, the capital adequacy ratio becomes superior to the minimum capital requirement, another prudential requirement for deposit protection. Berger (2010) points out that the threshold capital adequacy ratios for commercial banks and DTMFIs are 8 % and 12 %, respectively. This means that the capital adequacy ratio for DTMFIs is 50 % greater than the capital adequacy ratio for commercial banks indicating that DTMFIs are required to maintain high ratios of equity relative to their risk-weighted assets (CGAP, 2012). Conversely, the BCBS (2010) states that in some jurisdictions where there are no specialised microfinance laws, the capital adequacy ratio for DTMFIs and commercial banks are the same.

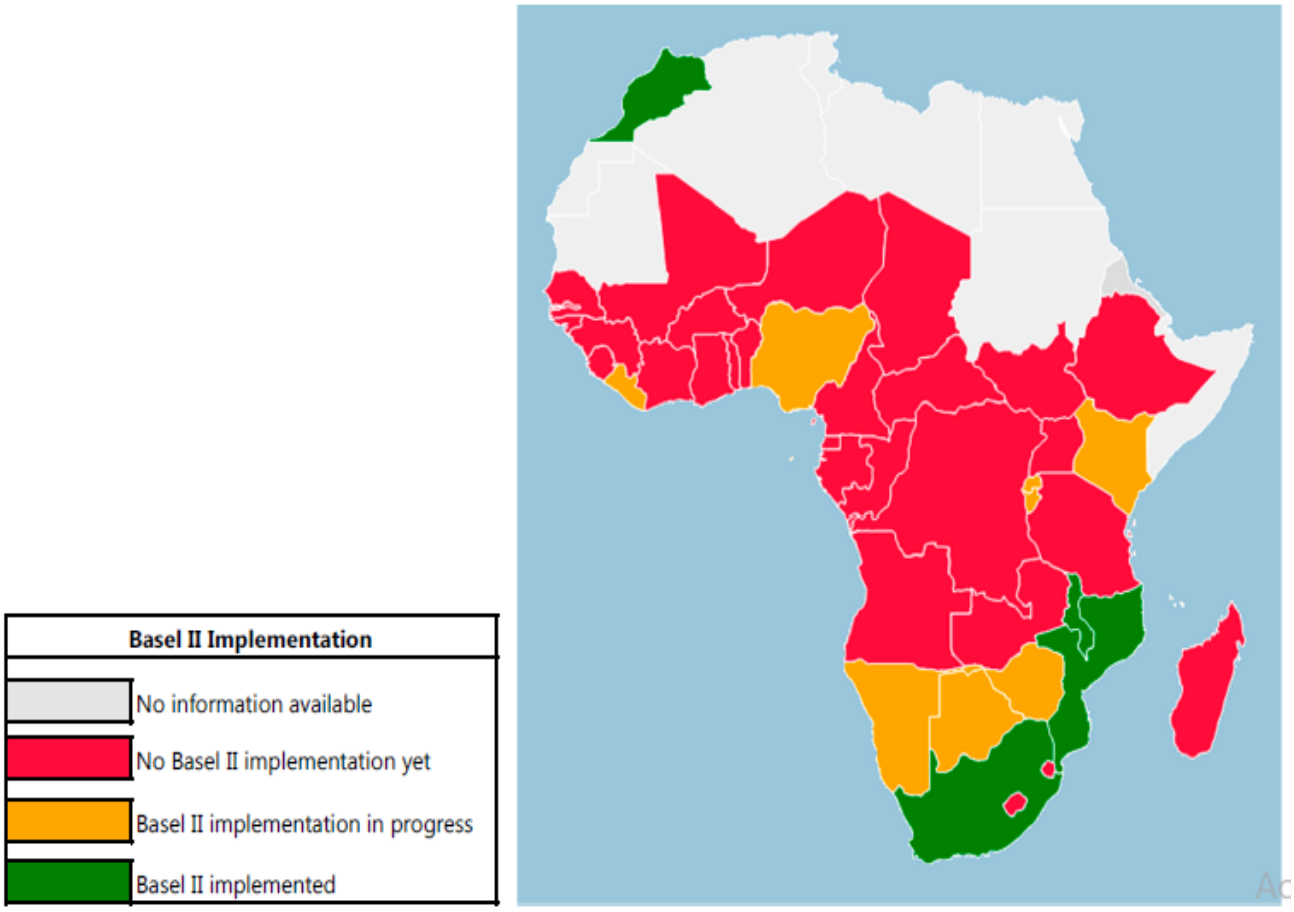
Several reasons have been cited in the empirical literature on why the capital adequacy ratio for DTMFIs should be higher than for commercial banks. Firstly, since low-income depositors cannot monitor the DTMFIs on how they intermediate their voluntary savings hence a higher capital adequacy ratio is justifiable as a means to protect their microdeposits (Tchakoute-Tchuigoua, 2016). Secondly, microfinance stakeholders such as the owners or investors are very cautious and do not readily respond to calls for increasing the capital bases of DTMFIs. Thirdly, the loan portfolios of MFIs are subjected to high levels of loan delinquency than the loan books of commercial banks (BCBS, 2010).

Figure 2.15 shows the state of affairs concerning the implementation of the capital adequacy standards in Sub-Saharan Africa based on the Basel framework. Additional details are shown in Appendix 2. Only a few countries in SSA have partly or fully implemented Basel II capital adequacy recommendations. When the SSA countries are categorised into LISSA and Non-LISSA[19] countries, interesting inferences are drawn. Only 7 out of 27 LISSA countries are implementing or have implemented the Basel framework recommendations. These LISSA countries are Burundi, Comoros, Liberia, Malawi, Mozambique, Rwanda and Zimbabwe.

In Non-LISSA countries, 8 out of 20 countries are implementing or have implemented the Basel framework capital adequacy recommendations. These Non-LISSA countries are Botswana, Cape Verde, Kenya, Mauritius, Namibia, Nigeria, Sao Tome and Principe and South Africa. Thus, there are lesser LISSA countries than are Non-LISSA that are implementing or have implemented the Basel framework capital adequacy recommendations. This indicates that based on the capital adequacy standard, low-income depositors from the LISSA countries are more exposed to the risk of non-payment of their savings by DTMFIs than are low-income depositors from the Non-LISSA countries.

[19] Based on the 2017 World Development Indicators of the World Bank, the Non-LISSA countries are Seychelles in the high-income (US$12 475 or more) category; Angola, Botswana, Equitorial Guinea, Gabon, Mauritious, Namibia, South Africa in the upper middle income (US$4 036 to US$12 475) category; Cape Verde, Cameroon; Congo, Republic; Cote d'Ivoire, Ghana, Kenya, Lesotho, Mauritania, Nigeria, Sao Tome and Principe, Sudan, Swaziland and Zambia in the lower middle income (US$1 026 to US$4 035) category.

Figure 2.15: Implementation of the Capital Adequacy Standard based on the Basel Framework in Sub-Saharan Africa



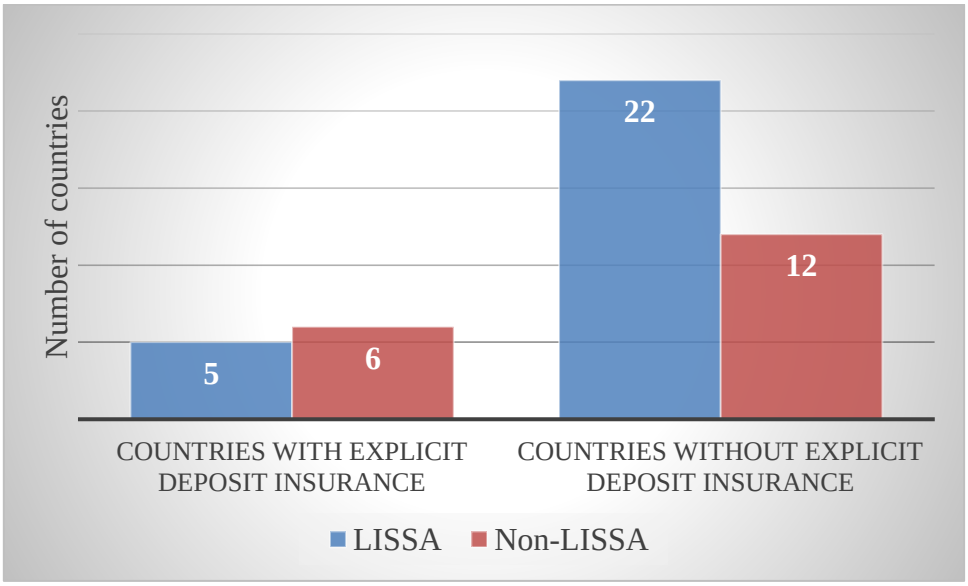
Source: Adapted from Mecagni *et al.* (2015, p. 29)

ii. Deposit Insurance

Depositors' savings are exposed to non-payment by deposit-taking institutions during periods of diminishing cash resources. This exposure necessitated the establishment of the first deposit insurance scheme in the United States in the 1930s after the Great Depression of 1929. Since then, many countries have implemented deposit insurance schemes (Demirgüç-Kunt *et al*., 2005). According to the fathers of the modern-day deposit insurance theory (Diamond and Dybvig, 1983), deposit insurance schemes help to avert widespread panic withdrawal of deposits in the event of a bank failure. In so doing, this helps to maintain the stability of the banking system since the panic withdrawal of deposits is contagious. Ngalawa (2012) noted that deposit insurance is important as it bolsters confidence in the functioning of the banking sector.

Taking into account the above-mentioned benefits of deposit insurance, empirical literature on deposit insurance additionally shows that two forms of deposit insurance schemes exist, implicit and explicit deposit insurance (Christen *et al*., 2003; Ngalawa, 2012; Demirgüç-Kunt *et al.*, 2015). Implicit deposit insurance assumes that in every jurisdiction, national governments act as a fallback for failing deposit-taking financial institutions. Explicit deposit insurance involves initiatives by central banks and the law in creating pools of deposit insurance funds that mitigate failure by deposit-taking financial institutions in repaying depositors' funds (Demirgüç-Kunt *et al.*, 2005; Izaguirre, 2016). Demirgüç-Kunt *et al.* (2015, p. 4) stated that "implicit coverage always exists, regardless of the level of explicit coverage" but it is not guaranteed that the national governments will act as a safety net for ailing deposit-taking financial institutions. Therefore, this means that explicit deposit insurance is superior as it is a better safeguard. Figure 2.16 shows the state of affairs in terms of the implementation of explicit deposit insurance[20] schemes in SSA.

Figure 2.16: Number of Countries with or without Explicit Deposit Insurance Schemes in Sub-Saharan Africa



Source: Compiled by the author using information from Mecagni *et al.* (2015, p. 28)

Figure 2.16 above shows that, of the 27 LISSA countries, only 5 (Central African, Republic; Chad, Tanzania, Uganda and Zimbabwe) have implemented explicit deposit

[20] The focus of this study is on explicit deposit insurance as implicit deposit insurance is a de facto scheme. Additional details of the list of LISSA and Non-LISSA countries on the adoption of explicit deposit insurance schemes is provided in Appendix 3.

insurance schemes while the remaining 22 have not. Of the 18 Non-LISSA's countries, only 6 (Cameroon; Congo, Republic; Equatorial Guinea, Gabon, Kenya, Nigeria) have implemented explicit deposit insurance schemes while the remaining 12 have not. Thus, only a few countries have explicit deposit insurance schemes in SSA indicating that depositors' funds are highly at risk should the deposit-taking financial institutions fail to contain panic withdrawals on deposits (Mecagni *et al.,* 2015). According to Demirgüç-Kunt *et al.* (2005) and Demirgüç-Kunt *et al.* (2015), explicit deposit insurance schemes have to be designed and implemented successfully based on several important considerations. The considerations are: organisation and administration of the deposit insurance pool, specifications on how the deposit insurance pool is funded, the types of contributory institutions, the amount and extent of coverage, the types of deposits that are covered, the types of contribution premiums and the assessment base and the form of pay-outs to depositors. According to McCoy (2007), having clear designs of explicit deposit insurance schemes for each national jurisdiction guards against pressure from power-sharing political associations and imitating the regulatory structures of well-advanced nations, having clear coverage limits, market discipline and a strong financial institutions framework. Explicit deposit insurance schemes in the LISSA countries where they are in place, are administered publicly with participation from both domestic and foreign banks. Table 2.3 below shows the design of explicit deposit insurance in the LISSA countries that have adopted the scheme.

In terms of deposits coverage, Central African Republic, Chad and Uganda cover foreign currency deposits and such deposits are not covered in Tanzania and Zimbabwe. Nonetheless, the explicit deposit insurance schemes of Tanzania and Zimbabwe both cover interbank deposits while the rest of the LISSA countries with explicit deposit insurance plans do not cover interbank deposits. In terms of funding, the explicit insurance deposit schemes amongst the LISSA countries are ex-ante funds that are funded privately. This means that the contributory banks contribute to their respective explicit deposit insurance pools at periodic time intervals prior to the pools' pay-outs. Only Zimbabwe has backstop arrangements if the funds from the deposit insurance pool are insufficient to cover any claims. In the contribution process, only the premiums that are paid by banks from Uganda are adjusted for risk.

Table 2.3: Design of Explicit Deposit Insurance Schemes in some LISSA Countries as of 2013

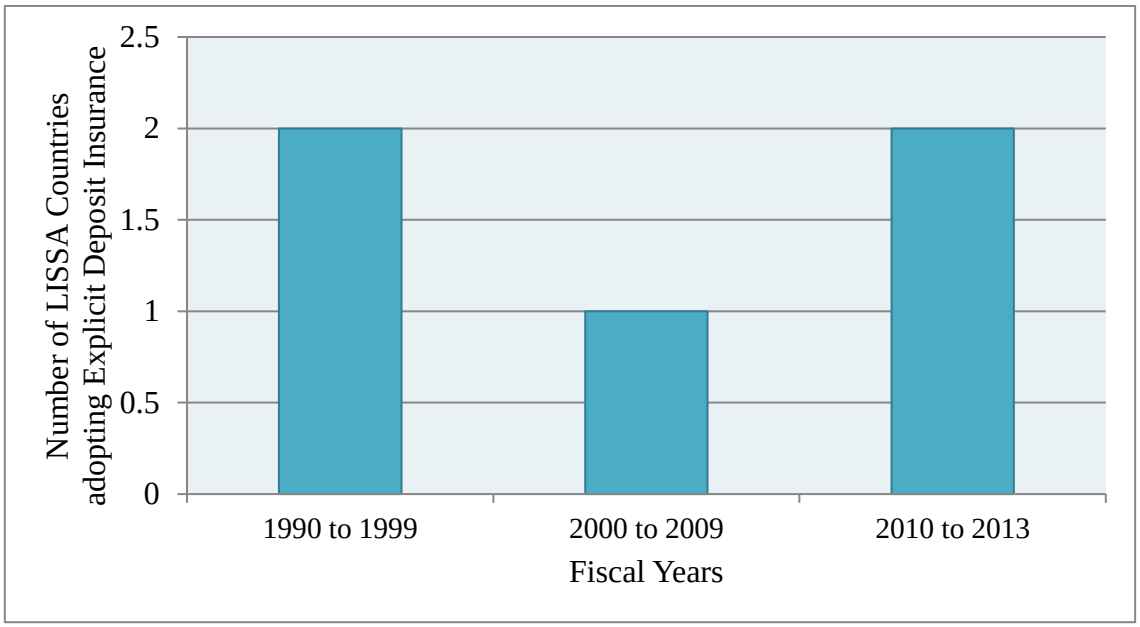
LISSA country and the date of enacting deposit insurance	Central African Republic (2011)	Chad (2011)	Tanzania (1994)	Uganda (1994)	Zimbabwe (2003)
Type of Deposit Insurance Scheme					
Explicit	x	x	x	x	x
legally separate	x	x	x		x
central bank, supervisor, or ministry				x	
administered publicly	x	x	x		x
administered privately					
administered jointly				x	
paybox only	x	x			
payboxplus, loss or risk minimiser			x	x	x
multiple schemes					
Participation and Coverage					
compulsory for domestic banks	x	x	x	x	x
local subsidiaries of foreign banks	x	x	x	x	x
local branches of foreign banks	x	x			
foreign currency deposits	x	x		x	
interbank deposits			x		x
Coinsurance					
Funding					
ex-ante fund					
ex-post fund					
funded by government					
funded privately	x	x	x	x	x
funded jointly					
Backstop					x
Contribution and Assessment Base					
risk-adjusted premium				x	
assessment base					
covered deposits					
eligible deposits					
total deposits	x	x	x	x	x
total liabilities					
Pay-outs to Depositors					
per deposit account					
per depositor per institution	x	x	x	x	x
per depositor					
deposit losses imposed					

Source: Adapted from Demirgüç-Kunt *et al.* (2015, p. 15-16)

The assessment base in the explicit deposit insurance pools in the LISSA countries as shown in Table 2.3 consists only of total deposits. In making pay-outs to depositors in the event

of bank runs, all the LISSA countries' explicit deposit insurance pools adopted the per depositor per institution pay-out method. According to Demirgüç-Kunt *et al.* (2015), disbursing funds to insured depositors this way benefits them when they have multiple accounts across different depository institutions. Figure 2.17 gives additional details on the rate of adoption and implementation of explicit deposit insurance schemes in the LISSA countries over time.

Figure 2.17: Rate of Adoption of Explicit Deposit Insurance amongst the LISSA countries between the years 1990 and 2013



Source: Compiled by the author using data on the deposit insurance databases by Demirgüç-Kunt *et al.* (2005) and Demirgüç-Kunt *et al.* (2015)

In the 1990s, only two LISSA countries enacted explicit deposit insurance schemes, Tanzania and Uganda in 1994. In the decade 2000 to 2009, only Zimbabwe adopted explicit deposit insurance in 2003 and between 2010 and 2013, Central African Republic and Chad followed suite. These statistics show that the adoption of explicit deposit insurance schemes amongst the LISSA countries has been very slow over the past 23 to 30 years. In light of the above discussion, it can be deduced that the LISSA DTMFIs cannot liquid and be effective poverty reduction tools if there are no insurance schemes to ensure the safety of deposits thereby stifling the outreach mission of keeping existing deposits and tapping new deposits for intermediation into loans and also providing other micro-financial services. Thus, there is a linkage between financial performance (liquidity in the short term and financial sustainability in the long term) and social performance (outreach). Next, outreach is discussed.

2.7 Outreach

2.7.1 The Concept of Outreach

Social performance in the microfinance sector is associated with the term ‘outreach’, a term which is also used in other fields such as religion and natural sciences (Rao and Fitamo, 2014). Outreach enables MFIs to provide a wide array of financial services to their clientele of varying income or poverty status. This has been made possible by the ever-increasing advancements in information and communication technologies such as the use of mobile devices in doing financial transactions and the growing realisation by national governments of promoting financial access to those that are financially excluded (Ndlovu, 2017). Xu *et al.* (2016) noticed that the social mission of the MFIs that is achieved through outreach distinguishes them from the commercial banking institutions and that it also varies across the MFIs depending on whether they follow a financial systems approach or a poverty lending approach. Littlefield, Murdoch and Hashemi (2003) had earlier on ignited this argument by stating that the social mission of the MFIs makes them superior to other poverty alleviation developmental efforts. Rao and Fitamo (2014) argued that outreach is hybrid in nature, based on the six dimensions of outreach that were propounded by Woller and Schreiner (2004); worth, cost, depth, breadth, scope and length. Combining these six dimensions produces a composite and technical definition: “outreach is worth minus cost, weighted by depth, summed across breadth of users and scope of contracts, and discounted through time” (Karanja, 2014, p. 4). Despite having six dimensions of outreach, empirical writers have mainly focused on outreach depth and breadth (Johnson, 2015; Bayai and Ikhide, 2016b; Abdulai and Tewari, 2017a). Depth of outreach relates to the qualitative aspects and breadth of outreach relates to the quantitative aspects.

2.7.2 Depth of Outreach

The depth of the outreach dimension is concerned about the demographic and economic status of the clientele served by the MFIs (Woller and Schreiner, 2004). On the demographic front, some population groups are considered. Firstly, reaching out more to women than men is a sign of deepening financial access because women are more vulnerable to poverty than men (Ann and Tam, 2013). Secondly, delivering financial services to the disadvantaged groups such as the disabled and the elderly deepens outreach. Thirdly, reaching out to those residing in rural areas, informal settlements or marginalised areas deepens outreach.

On the economic front, outreach is deepened when microfinance services and products are consumed by the unemployed mostly the youths or the economic active populations, those engaged in Micro, Small and Medium Enterprises (MSMEs), those that earn very low levels of income and those that live under the poverty datum line or the income poverty threshold of US$1.90 per day. Thus, extending financial services to the above seemingly underprivileged groups justifies the fact that the depth of outreach is associated with very small average balances on loans on the microcredit side and very small average deposit balances on the deposit-taking side (Chikaza, 2015; Amin *et al.,* 2017). However, some researchers in microfinance literature have criticised the depth of outreach facets. Small average balances have been criticised that they are not reflective of the poverty client spectrum but are said to be congruent with the term and type of the products offered and the delivery methodologies of their suppliers (Johnson, 2015; Churchill and Marr, 2017). As the clientele becomes repeat customers, the MFIs are prone to increase their average balances on loans. Also, deposits not withdrawn for prolonged periods accumulate and grow in size in pursuit of reinvestment gains. Residing in rural areas does not necessarily indicate that one is poor. Some wealthy individuals in low-income countries may prefer to reside in rural areas as a lifestyle habit. Increased women emancipation and equity in employment opportunities are indicators that women are becoming empowered and richer. In light of all these criticisms, outreach has been dubbed a vague concept in some empirical writings (Rao and Fitamo, 2014; Abdulai and Tewari, 2017a). The next section discusses breadth of outreach.

2.7.3 Breadth of Outreach

The breadth of outreach is associated with the volumes of microfinance services and products and the numbers of the active poor and the low-income households that are clients at a particular point in time (Rosenberg, 2009). Providing a variety of financial services and products to as many clients as possible in the right mix and quantities enables this dimension of outreach to be achieved. Drawing from the empirical writings of Schreiner (2002), Rosenberg (2009) and the Microfinance Information Exchange, the breadth of outreach measures related to microcredit provision are the number of active borrowers, the volume of the gross loan portfolio and the number of loans outstanding. On the deposit-taking side, the breadth of outreach is measured using the number of voluntary depositors, the volume of deposits and the number of deposit accounts. Empirics and reports from the MIX link the volumes of products or the number of clients served to the scale of operations (Wijesiri, Yaron

and Meoli, 2015; Xu *et al.*, 2016). For instance, small-scale MFIs serve less than 10 000 borrowers, medium-scale MFIs serve 10 000 to 30 000 borrowers and large-scale MFIs serve borrowers greater than 10 000 (MIX and the CGAP, 2012).

2.7.4 The Background on Outreach and Financial Sustainability

The success story of the Grameen Bank[21] of Bangladesh in the 1970s in the provision of microcredit to the poor who were deemed unbankable by commercial banks ignited the proliferation of MFIs across the four corners of the world (Vanroose and D'Espallier, 2013). As a result of this successful pioneering work and as alluded earlier on, the provision of microfinance is one of the main means of lessening the effects of poverty amongst the most vulnerable populations. In spite of the glory that has been ascribed to the role of microfinance provision in poverty alleviation, Huq *et al.* (2017) noted that the global microfinance sector faces turmoil in balancing the double bottom line objectives; outreach and financial sustainability. Since the origins of microfinance provision in the 1970s, MFIs primarily focused on outreach to the pro-poor and low-income households that are mostly in rural and marginalised areas. Additionally, the provision of microloans to women dominated the activities of these suppliers of microfinance, and as long as the means of operations was subsidised by donors and governments, the MFIs remained viable (Amin *et al.*, 2017).

In the 1990s, shrinkage in the supply of subsidy funding crept in and crippled the microfinance sector forcing the institutions to look into commercial funds; equity, debt, MIVs and voluntary deposits as the plausible solution (Barbosha, 2013). This prompted the rush for commercial sources of finance coupled with the pursuit of profitability which breeds financial sustainability (Quayes, 2012). As a result, there was a paradigm shift from the very costly outreach to the pro-poor in the rural and marginalised sections, to profitable outreach to the better-off poor in the urban and peri-urban areas, a phenomenon called 'mission drift' in microfinance literature (Zerai and Rani, 2011; Abdulai and Tewari, 2017a). Therefore, the next section discusses the nexus between outreach and financial sustainability.

2.7.5 Outreach versus Financial Sustainability

Outreach and financial sustainability are the benchmarks for analysis of social and financial performance of MFIs and they are also the widely debated concepts in microfinance

[21] The Grameen Bank and its founder Professor Muhammad Yunus received a Nobel Peace Prize in 2006.

(Anyawu, 2004; Rao and Fitamo, 2014). Put together, empirics have traditionally called them the double bottom-line objectives of microfinance provision and the interconnectedness of these dual objectives distinguishes the microfinance sector from the commercial banking institutions (Briere and Szafarz, 2014; Yeshi, 2015; Abdulai and Tewari, 2017a; Huq *et al.,* 2017; Khan, Shaorong and Ullah, 2017; Tadele, Roberts and Whiting, 2018). Additionally, Briere and Szafarz (2014) added that these dual objectives of MFIs distinguish them as hybrid financial institutions.

In line with the ever-changing business environment, models and different stakeholder requirements, there is, however, a growing move towards the triple bottom-line objectives which incorporate the environmental impact and awareness objective on top of the double bottom-line objectives (Guntz, 2011). It is in this regard that Millson (2013) opined that the outreach-financial sustainability relationship is dependent on the different requirements of stakeholders. Since outreach and financial sustainability are two sides of the same coin, there is an inconclusive debate amongst microfinance researchers on whether these two objectives can be achieved at the same time. Morduch (2000) called this debate the 'Microfinance Schism' while Rhyne (1998) dubbed it 'the Yin and Yang of Microfinance'. Thus, the top-level management in the microfinance sector has a huge task in this regard, as they have to balance both financial return and social return in their risk management framework (Parisetti and Kirimkan, 2015). Hence, there are three different views on the outreach-financial sustainability nexus.

The first group of microfinance researchers argues that outreach and financial sustainability can be achieved simultaneously. In other words, outreach and financial sustainability are parallel themes indicating that both can be achieved at the same time without any counter harm (Ek, 2011). In the same vein, Guntz (2011) acknowledged the compatibility between outreach and financial sustainability by contending that these two objectives can go hand in hand. Martínez (2015) also picked the row and argued that MFIs do well by doing good when there is compatibility between outreach and financial sustainability. According to Huq *et al.* (2017), compatibility between outreach and financial sustainability is very important as it produces synergies. From these views, it can therefore be deduced that outreach and financial sustainability are complementary objectives (Abate *et al.,* 2013; Yeshi, 2015). This is substantiated by empirical evidence on the success of bigger MFIs such as Bancosol in Bolivia which has reached out to vast masses of the poorest on a sustainable basis (Abdulai and Tewari, 2017a).

The second group of microfinance researchers is of the view that outreach and financial sustainability are conflicting objectives. MFIs pursue one objective at the expense of the other (Huq *et al.,* 2017). When financial sustainability is the primary goal, outreach is subordinate and vice versa. As argued by this group of researchers, MFIs shun the unemployed, the pro-poor and the rural folk whom they deem are costly to serve and then concentrate on the salaried, the better-off poor and the urban dwellers (Chikaza, 2015; Bhuiyan *et al.,* 2016). According to Cull and Morduch (2017), this increased focus by MFIs towards financial sustainability indicates that the MFIs have lost their moral compass. Thus, this group of researchers concurs that the financial sustainability drive has led MFIs to move away from their original mission of serving the huge masses of the unbanked populations, a marvel that is referred to as mission drift (Rouf, 2012; Millson, 2013; Abdulai and Tewari, 2017a). Mission drift is evidenced by the disbursement of large average loan balances, mobilising large average deposit balances and charging commercial microcredit interest rates[22] (Zerai and Rani, 2011). Accordingly, some researchers advocate that there exists a 'trade-off' between outreach and financial sustainability (Huq *et al.,* 2017). At this point, financial sustainability should equal outreach (Guntz, 2011). Abera (2010) referred to this point as the optimality of outreach and financial sustainability. The concepts of mission drift and trade-off are discussed in detail in section 2.7.6.

The third group of microfinance researchers is of the view that the outreach-financial sustainability relationship is neutral as these two objectives have no significant influence on each other (Huq *et al.,* 2017). This means that there is no relationship between outreach and financial sustainability, hence no trade-off. Nonetheless, Chikaza (2015) opined that whatever the relationship between outreach and financial sustainability may be, both objectives are pivotal in the fight against poverty. This is what Johnson (2015, p. 123) described as "eradicating poverty through profits". In this realm, Bassem (2009) likewise reasoned that financial sustainability ensures continual and not snapshot outreach. On the same strand, Helms (2006, p. 56) reiterated that:

> … "financial sustainability is necessary to reach significant numbers of poor people on a permanent basis. But building financially sustainable institutions is not an end in itself. Is it the only way to make an impact far beyond what donor agencies and most governments can fund?"

[22] It is argued that the poor can afford to repay microloans pegged at commercial rates which are influenced by the environment the MFIs thrive in (Rosenberg, Gonzalez and Narian, 2009).

The discourse on outreach and financial sustainability cannot be complete without noting that the financial mission has eclipsed the social mission given the notable commercialisation of MFIs. Commercialisation encourages the MFIs to be self-sufficient institutions through profit-orientation by seeking commercial sources of finance (equity and debt) and charging commercial interest rates on the lines of credit that they advance (Ledgerwood and White, 2006). Thus, commercialisation has pushed a number of social-oriented MFIs which followed the pro-poor outreach mission through subsidised funding to redirect their focus towards the financial mission. It is in this regard that a number of NGOs have turned into either NBFIs or microfinance banks by seeking deposit-taking licences which they were largely restricted to get in various jurisdictions (D'Espallier *et al.*, 2017).

The next section further discusses the concepts of mission drift and trade-off in detail.

2.7.6 Mission Drift and Trade-off

Mission drift is the shift of focus by MFIs from serving the remote poor, women clientele and those that reside in rural or marginalised areas with financial services packaged in micro-amounts, to serving the wealthier clients who mainly reside in urban areas and demand financial services of larger amounts (Hermes and Lensink, 2007; Armendariz and Szafarz, 2011; Churchill, 2019). Mission drift is mainly attributed to revolutionary changes or commercialisation of the microfinance sector in search of profitability (Kar, 2013; Rahman, Luo, Hafeez and Sun, 2015; Bayai and Ikhide, 2016b; Johnson, 2017). Hermes and Hudon (2018) associated mission drift with competition as the microfinance industry is evolving to include several financial service providers with profit motives. Hudon and Sandberg (2013) argued that commercialisation due to increased use of commercial funds leads to mission drift while commercialisation by MFIs as they try to cut on costs by applying market-based principles has fewer consequences for mission drift. Johnson (2017) argued that commercialisation mixed with market power results in mission drift but Ulla, Khawaja and Iqbal (2019) did not concur as they argued that there is no conclusive evidence that market conditions force MFIs to drift from their original mission. Xu *et al.* (2015) argued that the mission drift argument is stirred by both MFI characteristics and macroeconomic factors.

Hartaska (2005), Bassem (2009) and Hartarska, Nadolnyak and Mersland (2014) and Rahman *et al.* (2015) contended that the mission drift debate is hinged on corporate governance issues; stakeholder representation and their support for independent boards with limited participation of employees, gender diversity and board size.

Mission drift has implications for different microfinance stakeholders such as the clientele, MFIs and policymakers. Different studies point out that mission drift results in a change in the composition of the clientele served or target market; from poorer to wealthier; rural to urban; informal to formal; less focus on women; groups to individuals (Hermes *et al.*, 2011; Churchill, 2019). However, Cuéllar-Fernández, Fuertes-Callén, Serrano-Cinca and Gutiérrez (2016) argued that mission drift does not necessarily occur on the target market but may be on the interest margins. They noted that MFIs with high margins disburse small loans to compensate for the inherent high operating costs, therefore this does not mean that they have drifted from their original mission. Lowering interest margins in deepening outreach can only be done so by lowering operating costs. The recent work of Cull and Morduch (2017) states that the implication of mission drift for MFIs is that they will be considered as institutions that have lost their moral campus. Also, the father of microfinance provision, Muhammed Yunus and the Welfarists, criticise mission drift as it leads MFIs in becoming usurious moneylenders thereby putting a dent on the microfinance industry (Cull, Demirgüç-Kunt and Morduch, 2009; Mersland and Strøm, 2013; Bayai and Ikhide, 2016b). This, in turn, slows down macroeconomic policies that focus on microfinance as the vehicle for the financial inclusion agenda and eradication of extreme poverty.

Hermes and Hudon (2018, p. 6) defined the outreach-financial sustainability trade-off in microfinance as "the choice MFIs make regarding combinations of financial and social performance and the consequences this has for their operations". Hermes and Lensink (2007) argued that the empirical evidence on the outreach-financial sustainability nexus suffers from being anecdotal or case study driven. On the same note, Wijesiri *et al.* (2015) realised that the relationship between outreach and financial sustainability is dependent on ownership modalities since owners have their desired outreach and financial sustainability mix. Reichert (2018) observed that attainment of the dual objectives is a highly debated topic in empirical literature and that there are three sets of studies: firstly, those that report the existence of trade-offs; secondly, those that refute the existence of trade-offs, and thirdly, those that exhibit synergies.

Hermes and Hudon (2018) observed that the outreach and financial sustainability trade-off depends on the context-specific factors especially the country-specific context. On the same note, Lam, Zhang, Ang and Jacob (2019) argued that the existence of trade-offs shows that the MFIs are not consistent over time in the attainment of their dual objectives. According to Kar (2013), where trade-offs have been found, it is evidence that the MFIs are prone to mission

drift. In this realm, the third objective of this study was carried out as an attempt to check for the existence of trade-offs and/or mission drift in the depository microfinance sector of the LISSA countries in the pursuit of outreach and financial sustainability goals.

2.8 Conclusion

The primary goal of the 2016 to 2030 Sustainable Development Goals of the United Nations of eradicating extreme poverty through microfinance can only be achieved if microfinance provision in the LISSA countries is financially sustainable, liquid and reaches out to many of the poorest profitably under enabling macroeconomic conditions. The next chapter provides a theoretical and empirical review of the study.

CHAPTER THREE:
THEORETICAL AND EMPIRICAL LITERATURE REVIEW

3.1 Introduction

The theoretical and empirical literature review in this chapter is categorised into three sections in line with the three objectives of the study that were outlined in Chapter one. The first literature review section is based on the first objective of the study which looks at deposits and financial sustainability. The second literature review focusses on liquidity and deposit insurance, the study's second objective. The third section is a review of literature on outreach and financial sustainability which is the third objective of the study. The conceptual framework for the study based on literature review is also highlighted before the chapter summary which concludes this chapter.

3.2 Deposits and Financial Sustainability

3.2.1 Theoretical Framework for Deposits and Financial Sustainability

In an attempt to understand why DTMFIs in the LISSA countries fall short in attaining financial sustainability, this section discusses two theories that focus on deposits and financial sustainability. The first theory, the financial intermediation theory relates to deposits, and the second theory which is the Institutionalists' theory, relates to financial sustainability.

i. The Theory of Financial Intermediation of Deposits

The theory of financial intermediation has been the predominant banking theory on deposits and loans since the 1960s up to the present day (Werner, 2014; 2016). The origins of this theory can be traced back to the work of von Mises (1912) and Keynes (1936). According to this theory, deposit-taking financial institutions such as banks and DTMFIs mobilise deposits from market segments that have surplus cash resources or savings to intermediate them as loans to borrowers who are cash deficient. This theory also draws no lines of distinction between banks and non-banking financial institutions which mobilise deposits for intermediation. Deposits are a financing instrument for DTMFIs that are used to finance the loan book and the main operational activities. This results in financing costs being paid to the poor and low-income depositors in the form of interest. However, the work of Lützenkirchen and Weistroffer (2012) states that the interest that is paid to the microfinance depositors is usually very low thereby making microfinance deposits a relatively cheaper source of financing operations and

the loan portfolio. With very low financing costs, profitability is increased thereby boosting financial sustainability.

In the 1970s, Sealey and Lindley (1977) likened financial intermediation to a production process, whereby deposits are inputs which are intermediated or converted into output in the form of loans (Sealey and Lindley, 1977). Based on this view of the theory of financial intermediation, it means that as the DTMFIs increase their scale of operations through mobilising huge deposit volumes, they are in a way, adding more inputs into the production or financial intermediation process. Therefore, economies of scale come into play as noted by Ngo *et al.* (2014) who stated that optimal scales of operation in microfinance are established by understanding the relationships between inputs and outputs of financial institutions. In other words, as the volume of the deposits (inputs) increases, there are decrements in the costs of mobilising such deposits due to economies of scale implying that the depository microfinance sector in the LISSA region should be operating at a low cost as they have enormous deposit volumes. This breeds high operating profits which spearhead the attainment of financial sustainability.

The modern-day view of the theory of financial intermediation is still similar to the view of its earlier proponents (Werner, 2014; 2016). The limitation of this theory is that its advocates do not draw a line between banks and non-banking institutions when yet, all regulators of banking institutions and non-banking financial institutions across the world separate the two based on the nature of their operations, mission and target clientele. In addition, many financial services are solely provided by banking institutions which cannot be provided by the non-mainstream banking institutions including the DTMFIs. Jameaba (2018) further strengthened this point by arguing that banks are at the core of the financial intermediation process than the non-mainstream banking institutions because of their huge asset sizes.

ii. The Institutionalists' Theory of Financial Sustainability

According to the Institutionalists' theory which was propounded by Rhyne (1998) and Woller *et al*. (1999), both COMFIs and DTMFIs are profit-oriented institutions that primarily seek to attain financial sustainability through earning interest income or through cost recovery rather than reliance on donor funding. Financial sustainability is achieved through charging commercial microcredit interest rates or implementing cost-cutting measures both of which result in high operating profits (Rosenberg *et al.*, 2013). The Institutionalists believe that

delivery of microfinance without adopting a commercialised business model will lead to failure of MFIs going forward. Donors are not capable of bankrolling the operations of MFIs consistently into the future. It is only through the adoption of commercial capital and commercial lending rates that MFIs can attain financial sustainability (Ledgerwood and White, 2006).

This study, therefore, posits that the LISSA DTMFIs can attain financial sustainability through leveraging on the huge voluntary deposit volumes that they mobilise (commercial capital) to finance their operations because deposits as a financing option, are repayable at low interest rates (Lützenkirchen and Weistroffer, 2012). This is in line with the cost recovery approach of the Institutionalists' theory. Once financial sustainability has been achieved, the DTMFIs can then seek to achieve the subordinate objective; outreach. The main drawback of this theory is that it encourages MFIs to prioritise financial sustainability at the expense of reaching out to the poor and low-income households; the original mandate of microfinance provision.

3.2.2 Empirical Evidence

Empirical literature presents various results from several studies that looked at the financial sustainability of MFIs. The studies reviewed below were based on different samples; global, continental, regional, national and case studies.

Ayayi and Sene (2010) studied 217 MFIs across 101 countries for the years 1998 to 2006 using data obtained from the MIX in order to understand the drivers of the financial sustainability of MFIs. That study used the multiple linear regression technique and adopted the financial self-sufficiency ratio as the dependent variable. The estimated results showed that portfolio at risk and personnel costs are negative drivers of financial sustainability while financial revenue, age and the average loan balance are positive drivers of financial sustainability. The proportion of women clientele served was not found to be a significant driver of financial sustainability. Thus, the study of Ayayi and Sene (2010) indicated that the financial sustainability of MFIs is driven by their ability to contain internal factors. However, this study did not consider the external drivers of financial sustainability which were highlighted in other studies such as Gashayie and Singh (2015).

Nyamsogoro (2010) looked at the financial sustainability of 98 Tanzanian rural MFIs using primary and secondary data for the years 2004 to 2007 which were analysed using

different panel econometric methods; random effects, fixed effects, pooled Ordinary Least Squares (OLS), the instrumental variables technique and the Generalised Method of Moments (GMM). Operational self-sufficiency was the measure for financial sustainability. That study revealed that financial sustainability in the rural areas of Tanzania is influenced by several factors; "capital structure, interest rates charged, differences in lending types, cost per borrower, yield on gross loan portfolio, level of portfolio at risk, liquidity level, staff productivity and the operating efficiency" (Nyamsogoro, 2010, p. iv). The findings of Nyamsogoro (2010) were consistent with the findings of Ayayi and Sene (2010) as that study also did not consider the impact of the external environment in influencing the attainment of financial sustainability in the Tanzanian microfinance sector.

Bogan (2012) examined the capital structure of a global sample of MIX reporting MFIs that had US$1.3 million in total assets for the years 2003 to 2006. The MFIs sampled in this study were drawn from Africa, East Asia, Eastern Europe, Latin America, the Middle East and South Asia. That study investigated how changes in capital relate to efficiency and financial sustainability of MFIs. Using the OLS method, the deposits to assets ratio which is a proxy for deposit mobilisation, was found to be negatively related to operational self-sufficiency. That study yielded similar results when probit regression was utilised, but using the financial self-sufficiency ratio as the measure of financial sustainability. The results of the two stage instrumental variables approach found no significant relations between the deposits to assets ratio and financial sustainability. Bogan (2012) also concluded that financing operations through grants relates negatively with financial sustainability but is positive with the cost per borrower. This finding was later on also confirmed in the study of Bayai and Ikhide (2018).

Kinde (2012) investigated the financial sustainability of 14 Ethiopian MFIs using data for the years 2002 to 2010 obtained from the National Bank of Ethiopia and the MIX. The random effects model was adopted and financial self-sufficiency was the indicator for financial sustainability, the dependent variable. In line with Bogan (2012), the results of Kinde's study showed that dependence on donations for equity capital and the costs incurred in administering loans to borrowers pull down attainment of financial sustainability. Outreach depth (average loan balance per borrower) and breadth (logarithm of the number of active borrowers) were found to be factors that positively influence financial sustainability. Ayayi and Sene (2010) also found a positive association between outreach depth and financial sustainability. The coefficient of productivity as measured by the borrowers per staff member was not a statistically significant factor for attaining financial sustainability. On the contrary,

Nyamsogoro (2010) concluded that productivity of the staff members is significant in explaining financial sustainability.

Rai and Rai (2012) undertook a study to determine the factors that affect the financial sustainability of MFIs from India and Bangladesh utilising data from the MIX for the periods 2005-6 and 2009-10 of 26 MFIs which were drawn from each of these countries. Financial sustainability was proxied using operational self-sufficiency. Based on the multiple linear regression technique, Rai and Rai (2012) found out that financial sustainability is positively associated with high capital adequacy and financial revenue earned from the loans advanced. Operating expenses were found to impede attaining of financial sustainability. Factors such as financial leverage, inception and the percentage of women clientele were not statistically significant thereby corroborating the findings of Ayayi and Sene (2010).

Shaoyan and Duwal (2012) conducted a comparative analytic study of the financial sustainability of 12 Nepalese MIX reporting MFIs using data for the years 2006 to 2010. Using ratio analysis, their study found that the deposits to assets and deposits to loans ratios are highly significant in explaining financial performance. This finding is in marked contrast to the findings of Bogan (2012) who reported a negative relationship between the deposits to assets ratio and financial sustainability. Shaoyan and Duwal (2012) also concluded that the financial performance of MFIs in Nepal is dependent on the charter type. Financial performance in terms of the return on assets, return on equity and operational self-sufficiency surpassed the global benchmarks for all the charter types except for the government-owned MFIs. The co-operatives were found to perform well on the deposit-taking front as they are highly dependent on deposits for their operational existence and investment purposes.

Tehulu (2013) conducted a study on the determinants of financial sustainability in East Africa. That study utilised an unbalanced panel dataset for the years between 2004 and 2009 for 23 MIX reporting MFIs. The baseline results were obtained through the probit model and financial self-sufficiency was the dependent variable. Loan intensity as captured by the gross loan portfolio to total assets and size as measured by the logarithm of the total assets were found to be positive determinants of financial sustainability. The operating expenses ratio and loan portfolio quality (portfolio at risk) were found to be negative determinants of financial sustainability. Nonetheless, the results showed that deposits, as measured by the deposits to total assets, were not one of the key determinants of financial sustainability. This finding was not consistent with studies such as Bogan (2012) as well as Shaoyan and Duwal (2012) who

respectively found a negative and positive influence of deposits to assets on financial sustainability. Outreach breadth as represented by the logarithm of the number of active borrowers was positive but not statistically significant. In marked contrast, Kinde (2012) found a positive and significant relationship between the number of active borrowers and financial sustainability. As a robustness check, the ordered probit model was adopted, and corroborating results were found, except for financial leverage which was not significant.

Bhanot and Bapat (2014) attempted to derive a sustainability index of MFIs using the technique of order preference by similarity to ideal solution (TOPSIS) based on the factors that they considered as determinants of financial sustainability in India. They considered data of 81 MIX reporting MFIs for the year 2010 and adopted three dependent variables; average loan balance, logarithm of the number of borrowers and operational self-sufficiency. That study reported that size, as measured by the logarithm of the gross loan portfolio, the productivity of the loan officers, profitability when represented using the return on assets, are positive contributory variables for attaining financial sustainability. Financing the operations through leverage was found to contribute negatively to financial sustainability contrasting the findings of Rai and Rai (2012) who found financial leverage to be insignificant in influencing financial sustainability. In line with the conclusion of Tehulu (2013), financing the operations through deposits and ageing were also not found to be contributory factors towards achieving financial sustainability.

Long and Marwa (2015) carried out a study to find the determinants of the financial sustainability of 25 MFIs in Ghana utilising data from the MIX for the period between 2006 and 2011. They adopted the random effects econometric framework and measured financial sustainability using financial self-sufficiency. The operating expenses ratio was found to be negative with financial sustainability corroborating the results of Rai and Rai (2012). Similar to the results of Ayayi and Sene (2010), financial revenue was positively related to financial sustainability. Staff productivity was reported as a negative determinant of financial sustainability. This finding is consistent with Ayayi and Sene (2010) but contradicts the findings of Kinde (2012). The estimated results also showed that factors such as administration expenses, outreach depth and breadth, financial leverage, size and loan portfolio quality were insignificant determinants of financial sustainability. However, the result on financial leverage was not consistent with the findings of Bhanot and Bapat (2014) but was in line with Rai and Rai (2012). The insignificance of the portfolio at risk as a financial sustainability determinant confirmed the results of Rai and Rai (2012) but was contrary to the findings of Ayayi and Sene

(2010) as well as Bhanot and Bapat (2014) who reported that portfolio at risk is negative financial sustainability.

After conducting a comprehensive literature review of different studies that were conducted across different parts of the world, Gashayie and Singh (2015) concluded that the factors that affect the financial sustainability of MFIs are in three categories; borrower related factors, macroeconomic factors and MFI-related factors. The borrower related factors include cost per borrower, number of active borrowers, women borrowers and group lending. The macroeconomic factors that influence financial sustainability were identified as per capita income, interest rate, competition, degree of economic freedom. Of the MFI-related factors, the following were identified; outreach breadth and depth, staff productivity, size, loan intensity, age, capital structure variables, yield on the gross loan portfolio, operating expenses ratio, management efficiency and deposit mobilisation.

Bayai and Ikhide (2016a) also conducted a literature review study in an attempt to derive a conceptual view on financing and financial sustainability of MFIs. The financing options considered included subsidies, debt, deposits and equity and all these were found to vary across regions. Subsidised funding was identified as a financing option that has become less popular in the capital structure of MFIs due to its dwindling nature, dependency syndrome and inefficiency and the paradigm shift towards the commercial sources of finance. Smart subsidies, that is, subsidies that are within limits and designed carefully were therefore considered as the ones that improve financial sustainability. Debt financing was found to contribute to the attainment of financial sustainability through addressing the agency problem but it was cautioned that it has to be kept at very low levels so as to avoid the risk of running into insolvency and mission drift. Nonetheless, other studies reported different results on the use of financial leverage in augmenting financial sustainability (Rai and Rai, 2012; Tehulu, 2013; Bhanot and Bapat, 2014). Deposit financing was found to significantly influence financial sustainability but it is embedded with compliance costs that erode operating revenues. This finding was consistent with Shaoyan and Duwal (2012) but contradictory to Tehulu (2012). Equity financing was also found to spur the attainment of financial sustainability.

Mwizarubi *et al.* (2016) examined the financing paradigms of Tanzanian MFIs using time series quarterly data for the years 1997 to 2014 of the National Microfinance Bank. Using the OLS method, three models were estimated using three different dependent variables for measuring financial sustainability; return on assets, operational self-sufficiency and financial

self-sufficiency. The study concluded that the deposits to assets ratio is positively correlated with financial sustainability measures; the operational self-sufficiency ratio, the financial self-sufficiency ratio and the return on assets. This conclusion is corroborated by Shaoyan (2012) as well as Bayai and Ikhide (2016a). Equity capital was also found to significantly contribute to operational self-sufficiency in line with the findings of Bayai and Ikhide (2016a). However, equity financing was not statistically significant with financial self-sufficiency and the return on assets. Financial leverage was not found to influence financial sustainability in all the estimated models. Subsidy funding was not considered unlike other studies such as Bogan (2012), Tehulu (2013) and Bayai and Ikhide (2016a).

Bayai and Ikhide (2018) used an unbalanced panel dataset of 60 selected MIX reporting MFIs from the Southern Africa Development Community (SADC) for the years 2006 to 2012. Their estimated probit regression output did not show any significance of deposits in explaining the likelihood of attaining financial sustainability. This finding is consistent with the findings of Tehulu (2013) and is in contrast to the findings of Bogan (2012). Donations were found to reduce the likelihood of attaining financial sustainability in concurrence with Bogan (2012). Equity financing and the real yield on the gross loan portfolio were found to increase the likelihood of attaining financial sustainability. This finding is similar to the finding of Mwizarubi *et al.* (2016). Financial leverage, new and mature MFIs, cost per borrower and portfolio at risk were factors that were found to reduce the likelihood of attaining financial sustainability.

Wambua (2018) examined the effect of capital structure variables on financial sustainability using ten-year data for the years 2006 to 2015 of DTMFIs in Kenya. However, Wambui (2018) did not consider deposits as a capital structure variable unlike the other studies such as Bogan (2012) as well as Bayai and Ikhide (2016a; 2018) that also looked at the capital structure of MFIs. Nonetheless, the results of her study through multiple regression analysis pointed out that the use of leverage (debt) and ploughed back profits (equity) significantly influence financial sustainability positively. Equity in the form of common stock was found to be negatively related to financial sustainability contradicting the findings of Mwizarubi *et al.* (2016) and Bayai and Ikhide (2018) who found a positive relationship between equity financing and the likelihood of attaining financial sustainability.

A closer look into the aforementioned previous research works reveals that financial sustainability of MFIs is affected by a myriad of factors. Moreover, the present study notes that

there are differences in the determinants of financial sustainability of COMFIs and those of DTMFIs as the latter financial institutions have a different working environment cost-wise[23] compared to the former financial institutions. Deposits, as one of these factors, were linked to financial sustainability using the deposits to assets ratio and mixed results were reported. The relationship between deposits to assets and financial sustainability was found to be positive, negative and insignificant with financial sustainability in different locations using different methodologies and samples. The variability of these findings in empirical literature confirms the observation made by Bayai and Ikhide (2016a) that the association between deposits and financial sustainability of MFIs varies from one region to another. Nonetheless, none of the above-cited prior research works have attempted to explain why the LISSA's depository microfinance sector despite its huge deposit volumes, has recorded failures of DTMFIs in achieving financial sustainability. Accordingly, this study intends to fill this research gap. Unlike the previous studies, this study uses scales of operations of deposit volumes in attempting to explain why the depository microfinance sector of the LISSA countries is found wanting in attaining financial sustainability.

The next section is a literature review on liquidity and deposit insurance, the second objective of the study.

3.3 Liquidity and Deposit Insurance

3.3.1 Theories on Liquidity and Deposit Insurance

This section discusses three theories. Firstly, there is a discussion of the theory of financial intermediation with a special focus on its provision of the liquidity arm. The second theory relates to deposit insurance. The third theory under discussion is the liquidity preference theory.

i. The Provision of Liquidity Function of the Theory of Financial Intermediation

This section builds on what was discussed in Section 3.2.1 on the theory of financial intermediation by focussing on one of its arms, the provision of liquidity. The provision of liquidity arm of the theory of financial intermediation is one of the main functions of financial

[23] Regulatory costs are heavy on the DTMFIs given the higher capital requirements, licensing and other legal costs; and deposits have to accumulate to a certain level before they can edify financial sustainability (Robinson, 2004; Ledgerwood and White, 2006; Bayai and Ikhide, 2016a).

intermediaries; banking and non-banking institutions (Andries and Cuza, 2009). According to Diamond and Dybvirg (1983), financial intermediaries exist to provide liquidity to depositors whenever they require their funds in the form of withdrawals. Deposits are a liability to a financial intermediary that must be repaid when the need arises. McCoy (2007) stated that financial institutions also provide liquidity to borrowers in the form of loans, one of the financial institutions' assets. Thus, financial intermediaries meet their short-term financial obligations through a system of asset and liability management. In cases of panic withdrawals, financial intermediaries are most likely to be illiquid due to the runs on deposits. As a counter, financial intermediaries like commercial banks subscribe to deposit protection schemes which help to safeguard depositors' funds thereby guaranteeing the supply of withdrawals on deposits.

The provision of liquidity arm of the theory of financial intermediation has been applied by microfinance researchers in different studies (Ogol, 2013; Odunga *et al*., 2013; Sam, 2015). Supported by Tehulu (2016), these microfinance writers argue that DTMFIs and COMFIs should be able to provide liquidity to their clientele by meeting their withdrawals on deposits and loan requests.

ii. Deposit Insurance Theory

The origins of the deposit insurance theory are attributed to the reputable work of Diamond and Dybvig (1983). According to this theory, deposit-taking financial institutions seek insurance cover against panic and unexpected runs on deposits to preserve the liquidity of these institutions (Calomiris and Jaremski, 2016). In addition, deposit insurance cover helps to curb contagion risk in the financial system when one deposit-taking financial institution fails (Riquet and Poursat, 2013) and also helps to attract new deposits since the potential and existing depositors would trust that their funds are safe (Calomiris and Jaremski, 2016). This way, deposit insurance provides or preserves liquidity in deposit-taking financial institutions. In spite of these benefits, it has been argued that deposit insurance schemes may alter the behaviour of the deposit-taking institutions thereby igniting the moral hazard problem (Ngalawa, 2012).

Moral hazard in deposit-taking is the danger that deposit-taking financial institutions may take an excessive risk using depositors' funds as they have the assurance that any losses incurred will be borne by the deposit insurance pool (McCoy, 2007). According to Ngalawa (2012), excessive risk-taking behaviour by banking institutions occurs on the liability side of the banks' balance sheets. On the assets side, the moral hazard problem emanates from the

depositors themselves. Hughes and Mester (2013) wrote that excessive risk-taking by deposit-taking financial institutions takes place when there are arbitrage opportunities in the pricing of deposit insurance. However, this excessive risk-taking ultimately exposes the deposit-taking financial institutions to liquidity risk (Calomiris and Jaremski, 2016). The moral hazard problem, however, was not incorporated in the pioneering work on the theory of deposit-insurance by Diamond and Dybvig (1983). Later writers on the theory of deposit insurance schemes added that the absence or presence of these schemes tends to influence the behaviour of depositors differently (McCoy, 2007; Carroll and Takayama, 2010).

In the absence of deposit insurance cover, depositors discipline deposit-taking financial institutions from excessive risk-taking as they know that they do not have the fallback. In this regard, the depositors punish deposit-taking financial institutions either by withdrawing their funds which depletes liquidity or by demanding high returns on their deposits. Where deposit insurance cover is present, depositors can hardly punish the banks as they trust that their deposits are protected. This way, Calomiris and Jaremski (2016, p.1) wrote that "deposit insurance reduces liquidity risk by removing the incentives of depositors to withdraw from banks when concerned about insolvency risk".

iii. The Liquidity Preference Theory

The liquidity preference theory was founded by John Maynard Keynes in 1936. According to the liquidity preference theory, liquidity refers to the money held in the form of cash and when people prefer to have money in the form of cash; their preference is called liquidity preference. This liquidity preference is due to transactional, precautionary and speculative motives. The liquidity preference theory assumes that the transactional and precautionary motives are highly income elastic while the speculative motive is interest rate elastic. Another assumption is that the money supply as determined by the monetary authorities is fixed and perfectly inelastic. The monetary authorities influence the interest rates and when they cannot, the economy would be in a liquidity trap. The interest rate is determined by factors that affect the liquidity preference of the economic agents or it can be said that the rate of interest is the payment for partying with liquidity. Thus, the interest rate is the point where money demand is equal to the money supply. The limitations of the liquidity preference theory are that it does not take into account that the interest rate can be determined by non-monetary factors also. The liquidity preference theory ignores the fact that for investments to take place

there should be savings. Some microfinance scholars applied the liquidity preference theory in their studies; Kimathi *et al.* (2015) and Murage and Muiru (2016).

3.3.2 Empirical Evidence on Liquidity and Deposit Insurance

Liquidity in the microfinance sector is influenced by several factors. Of these factors, the first category relates to the behaviour of the depositors in lodging and withdrawing their deposits; the second category relates to MFI-specifics and the third category relates to macroeconomic factors.

The studies of Mata (2011) and Maxwell *et al.* (2018) looked at the behaviour of depositors in influencing liquidity in the microfinance sector.

Mata (2011) considered 7828 deposit contracts for the years 2002 to 2008 drawn from 12 village banks in the Malian Rural Microfinance Network, PASECA-Kayes. Deposits were divided into two classes; migrants' deposits which are the deposits or remittances of those that are in the diaspora into DTMFIs of the home country, and the locals' deposits in the DTMFIs of the home country. The distribution of withdrawals was calculated through a bootstrapping technique. That study concluded that migrants' deposits expose DTMFIs to liquidity risk as the migrants were found to withdraw their time deposits before maturity. Furthermore, it was concluded that the level of deposits at risk is higher for migrants than for locals. Under such circumstances, Milosevic and Kalos (2016) stated that such deposits are unstable, and lead the deposit-taking financial institutions to prolonged episodes of liquidity problems which expose them to the risk of insolvency.

Maxwell *et al.* (2018) carried out a study to examine liquidity risk faced by Ghanaian MFIs and how it can be managed after consolidating in-depth interviews' responses from 84 respondents drawn from 6 MFIs across the Greater Accra Region of Ghana. The MFIs surveyed had been operational for at least 10 years. Maxwell *et al.* (2018) discovered that large withdrawals by depositors during the last quarter of each year cause acute shortages of liquid resources in the first quarter of each next subsequent year. In addition, the study unveiled that Ghanaian MFIs also do not assess their liquidity positions periodically. Thus, these discoveries indicate that liquidity risk is very high in the microfinance sector of Ghana.

Another set of researchers discovered that the liquidity in microfinance businesses is influenced by institution-specific variables.

Kipesha (2012) studied the efficiency of 35 MIX reporting MFIs sampled across 5 countries in East Africa using data for the period between 2009 and 2011. Using the Data Envelopment Analysis (DEA) approach, the study revealed that reliance on donations, grants and subsidies creates liquidity problems for MFIs which cripple their operations. This shows that reliance on external sources of finance exposes MFIs to liquidity risk as external funds may not be readily available when desperately needed or when they dry up. However, in terms of efficiency, the East African MFIs were found to have high efficiency scores particularly those with a banking licence and those that operate as non-banking financial institutions.

Kimathi *et al.* (2015) surveyed 96 employees selected across 6 MFIs in Kenya on the factors affecting the liquidity risk management practices of MFIs. Through multiple linear regression, the study found that the institution's internal controls, institution policies, board management oversight and institution's risk monitoring systems affect the liquidity risk management practices of MFIs. This study showed that top-level managers of financial institutions have a greater task of formulating and implementing effective liquidity strategies and policy frameworks.

Wambui and Wanjiru (2016) carried out a study to examine the effect of credit risk on the liquidity of 5 DTMFIs in Kenya using data for the years 2010 to 2013. Liquidity was measured using cash and cash equivalents divided by total assets and the explanatory variables included credit risk as measured by the risk coverage ratio, financial leverage, gross loan portfolio to total assets, operating expenses ratio and portfolio at risk. Using multiple linear regression, the estimated results indicated that managing credit risk is positively related to liquidity together with the gross loan portfolio to total assets, efficient management of the level of operating expenses and financial leverage. However, portfolio at risk was found to be negative with liquidity.

Laureti and Szafarz (2016) investigated the liquidity premium of 28 banking institutions and 5 MFIs in Bangladesh using data for the year 2012. The OLS method was used in the econometric estimation process and liquidity premium was used as the dependent variable. Of the explanatory variables, the MFI and public ownership dummies were negative and significantly related to the liquidity premium variable. Religious orientation which was also a categorical covariate showed that Islamic institutions were significant contributors towards liquidity premium while the log of total assets was insignificant. The study also

concluded that liquidity premium is lower in MFIs than in banks due to time inconsistences of the poor clientele served by the MFIs.

Mamathi *et al.* (2017) who also surveyed the 12 Microfinance Banks (MFBs) in the Nairobi county in Kenya proxied liquidity using the working capital ratio. After applying multiple linear regression, the study unearthed that liquidity stress testing measured using a 5-point Likert scale positively affects the liquidity of MFBs. However, profitability, as measured by the return on assets and return on equity ratios and the loans to deposits ratios, was found to have negative effects on the liquidity of MFIs.

Some strands of empirical work show that liquidity in the microfinance sector is subject to a plethora of macroeconomic factors.

Chikoko and Kwenda (2013) looked at the challenges that crippled the microfinance sector of Zimbabwe during the hyperinflationary period of the years 1999 to 2008. They surveyed 100 MFIs selected across three major cities in Zimbabwe; Harare, Bulawayo and Gweru. They discovered that hyperinflation did not only stifle economic activity but also choked liquidity in the microfinance sector through the setting of withdrawal limits by the Zimbabwean central bank. The negative repercussions of withdrawal limits on the microfinance businesses were that disbursements were slowed down due to limited cash available and collection problems were common. Hyperinflation also lead to the erosion of capital of the MFIs and the institutions also faced high operating costs which further dwindled their liquid resources.

A Kenyan study by Bichanga (2016) investigated the effect of macroeconomic variables on the corporate liquidity of 12 Microfinance Banks (MFBs) between 2011 and 2015. Liquidity was proxied using gross loans and advances to customer deposits. Using regression inferential statistics, the study revealed that inflation measured by the Consumer Price Index (CPI), economic activity proxied using the Gross Domestic Product (GDP), exchange rates and interest rates, positively influence the liquidity of MFIs.

After considering the above empirical studies, the current study noted that none of them considered how deposit protection in the form of deposit insurance is a determinant of liquidity in depository microfinance in the context of Low-Income Sub-Saharan Africa. This study, therefore, intends to fill this literature gap because over time, several DTMFIs in the LISSA countries have been defaulting in repaying depositors' funds as deposit insurance schemes are

not in place in most of the countries where the DTMFIs are operational (Riquet and Poursat, 2013; Boateng *et al.*, 2016). Thus, there is scanty literature on deposit insurance in the microfinance sector but there a few empirical studies on deposit insurance in the conventional banking stream.

Ngalawa (2012) examined banking instability and deposit insurance of 118 countries using deposit insurance data that spanned the period, 1980 to 2004. Banking instability (bank runs and insolvency) was the dependent variable which was captured as a dummy variable hence a logit model was adopted. The estimated marginal effects indicated that deposit insurance was an insignificant coefficient in explaining banking instability indicating that the trade-off between costs and benefits of adopting deposit insurance is neutral. Based on this finding, that study concluded that deposit insurance effects on banking stability must be country-specific. Furthermore, that study did not find strong evidence that the banking sector in low-income countries is more prone to banking instability than the banking system in high-income countries. Low levels of real GDP per capita were found to increase the probability of banking instability while the inflation rate was found to have no significant impact on banking instability.

Anginer, Demirgüç-Kunt and Zhu (2013) looked at how deposit insurance affects bank risk and stability following the recent global financial crisis using data from the Bankscope database for the years 2004 to 2009 of 4109 banks sampled across 96 countries. Bank risk was captured using two measures; the log value of the bank's z score and bank stock return volatility. Bank stability or systemic risk was proxied using the marginal expected shortfall measure. Deposit insurance was incorporated in the OLS regressions in two ways; firstly, as a dummy variable indicating whether a country had adopted explicit deposit insurance or not and whether the insurance cover was effective the last time a bank failed; secondly, a full coverage dummy that indicated whether a country offered full cover or not. The bank control variables included log of total assets, leverage, deposits to total assets, loan loss provisions and the return on assets and macroeconomic controls were GDP growth, log of population, trade over GDP, stock market capitalisation over GDP, supervisory quality and private credit over GDP. The findings of that study were that in the pre-crisis era, adoption of deposit insurance schemes led to increased bank risk and systemic risk thereby catalysing the moral hazard problem but during the crisis, bank risk was lower while systemic risk was higher indicating the stabilisation effect of deposit insurance. After consolidating the pre-crisis sample and the during-crisis sample, Anginer *et al.* (2013) discovered that the results of the net effect of deposit insurance was

negative as the destabilising effect during the normal period outweighed the stabilising effect during the financial crisis but this can be reduced by effective and enabling bank supervision.

Calomiris and Jaremski (2016) examined the effect of deposit insurance on risk-taking, bank behaviour and market discipline in the early 20th century banks in the United States. Their study utilised annual bank data from All Bank Statistics for the period between 1900 and 1920 and biennial bank data for the same period from Comptroller of the Currency and country-level data from the Census data. The conclusions of Calomiris and Jaremski (2016) were that implementation of deposit insurance schemes led to the reduction of market discipline as the depositors became reluctant to monitor banks thereby increasing the risk of insolvency of the insured banks. Also, the findings of that study indicated that the insured banks rushed for deposits in direct competition with the uninsured banks using the insurance cover as their competitive edge.

Jameaba (2018) considered the impact of the establishment of the Indonesia Deposit Insurance Corporation on financial intermediation of Indonesian banking institutions. Data spanning the period 2000 to 2016 from the Bank of Indonesia and Financial Services Supervisory Agencies was utilised. The study employed technical analysis, trend analysis and multiple regression analysis to examine deposit insurance and financial intermediation which was measured using bank credit. Jameaba found that the introduction of the deposit insurance scheme ignited the moral hazard problem and also prompted the banking institutions and the depositors to be risk averse as they shifted from term and demand deposits to savings deposits and increased holding of risk-free treasury instruments. Thus, enactment of the deposit insurance scheme made savers in Indonesia to worry about the expected returns on the funds deposited and not necessarily the safety of their deposits.

The next section reviews literature on the third objective of the study that looks at the relationship between outreach and financial sustainability.

3.4 Outreach and Financial Sustainability

3.4.1 Theoretical Background on Outreach and Financial Sustainability

MFIs prioritise either outreach or financial sustainability based on two contrasting theories, the Welfarists' Theory and the Institutionalists' Theory. A couple of empirical studies provide evidence of the application of these two theories. On the one hand, some findings support

Welfarism and on the other hand, some findings support Institutionalism (Woller *et al.*, 1999; Morduch, 2000; Zerai and Rani, 2011; Bangoura, 2012; Shaoyan and Duwal, 2012; Rao and Fitamo, 2014; Johnson, 2015; Xu *et al.*, 2016; Rajer and Bhatt, 2016; Yeshi, 2015; Chikaza, 2015; Abdulai and Tewari, 2017b; Amin *et al.*, 2017; Khan *et al.*, 2017).

i. The Welfarists' Theory

The Welfarists' theory was put forward by Christen (1997), Rodney (1997), Hatch and Frederisck (1998), Morduch (1999; 2000) and Woller *et al.* (1999). Welfarists or the 'poverty camp' (Rhyne, 1998) argue that MFIs exist to provide financial services to the core poor at affordable prices meaning that microcredit interest rates must be very low. The emphasis of Welfarism is that outreach to the pro-poor is superior to pursuing financial sustainability and thus uplifting the depth of outreach banner. Welfarists assume that MFIs are socially-oriented institutions and are not-for-profit making concerns. MFI operations, therefore, should be donor subsidised therefore there is no need to charge high interest rates on microcredit. The limitations of this theory are connected to some of its assumptions. The theory disregards the fact that the supply of grants and donations may not be even, for instance, donor funding to MFIs dwindled during the past decade's Global Financial Crisis (Amin *et al.*, 2017). Another limitation is that in practice, MFIs usually charge commercial interest rates on microcredit and some empirical findings show that the MFIs still get clients beyond their capacities as the clients can afford paying commercial interest rates (Rosenberg *et al.*, 2013).

ii. The Institutionalists Theory of Financial Sustainability

The discussion of the Institutionalists' theory of financial sustainability or the 'sustainability camp' (Rhyne, 1998) in this section is an extension of its discussion under section 3.2.1(ii) which mainly focussed on how the theory explains the financial sustainability of MFIs. In the current section, the discussion of the Institutionalists' theory relates to how this theory explains outreach and how it may or may not lead to mission drift. Though it is argued that the financial mission of the MFIs has eclipsed the social mission given the un-assailable and widespread commercialisation of MFIs (Ledgerwood and White, 2006; Lützenkirchen and Weistroffer, 2012), there is complementarity between the Welfarists and the Institutionalists. On the one hand, following the Institutionalists approach can lead to mission drift because profit-orientation encourages the MFIs to levy high administration costs on small average balances of financial products and services (Bayai and Ikhide, 2016a). On the other hand, the Institutionalists argue that there is the possibility of satisfying the social mission through

attaining financial sustainability which enables the MFIs to exist continually in serving their target market. Thus, financial sustainability is not an end itself rather, financial sustainability is a means to an end which is outreach to the poor (Otero, 1999). In other words, the 'sustainability camp' complements the 'poverty camp', therefore, pursuing financial sustainability does not necessarily lead to mission drift.

3.4.2 Empirical Evidence

An empirical review of literature shows evidence of a mixture of results on the outreach-financial sustainability relationship. Some strands of empirical evidence support the Welfarists suggesting that outreach is of prime consideration instead of financial sustainability in running a microfinance business. Some findings support the Institutionalists' view suggesting that financial sustainability is achieved at the expense of outreach. In some cases, the empirical findings are neutral, supporting neither of the two views indicating that outreach and financial sustainability can be both achieved at the same time.

Hartarska and Nadolnyak (2007) studied 114 MIX reporting MFIs drawn across 62 countries to examine whether the regulated microfinance institutions achieve better outreach and financial sustainability. The Generalised Least Squares method was used. Financial sustainability was measured using operational self-sufficiency while the logarithm of the number of active borrowers was used as the proxy for outreach. Regulation was captured as a binary variable indicating whether an MFI is regulated or not. Amongst the control variables were MFI specifics (capital, loans to assets, age, size, deposits to total assets, charter type, competition) and macroeconomic variables (official supervisory power, informality, economic freedom, inflation, GDP per capita, log of GDP, deposit insurance, government intervention index, legal origin). That study found that imposing regulations on MFIs do not directly influence the way they balance their outreach and financial sustainability goals. The use of debt in the financing structure and operating in an inflationary environment was found to lead to increased financial sustainability. This finding is not consistent with the study of Bhanot and Bapat (2014) who reported that the use of debt in the capital structure impedes the attainment of financial sustainability. The NGO charter type, per capita income, economic freedom and having property rights variables were not significant in explaining financial sustainability.

Mersland and Strøm (2010) carried out a study using a combination of panel econometric methods to investigate the existence of mission drift in microfinance provision, utilising data for the period 1998 to 2008 of 379 rated MFIs selected across 74 countries. Their

findings did not show the existence of mission drift and they suggested that MFIs can deepen their outreach (reduce the average loan size) as long as this is followed by cost-cutting measures so that profitability is not eroded. Furthermore, their results were robust to other mission drift measures; the proportion of women clientele served by the MFIs and lending methodology (group to individual) and target market (rural to urban).

Hermes, Lensink and Meesters (2011) used the stochastic frontier analysis on data from the MIX that stretched from 1997 to 2007 comprising 435 MFIs. Their results showed that deepening outreach by focusing on the remote poor with very small average loan balances and targeting women clientele is costly to MFIs resulting in reduced efficiency. Thus, they concluded that there is a trade-off between outreach depth and efficiency. This result also suggested signs of mission drift as the MFIs change the composition of their clientele in search of efficiency. Ageing of the MFIs was found to result in reduced inefficiency but group-based lending was found to favour efficient operations due to the influence of group cohesion in the repayment of loans.

Zerai and Rani (2011) investigated 85 Indian MIX reporting MFIs using data for the year 2009 through correlation analysis. The data were analysed using correlation analysis. That study found a strong positive association between financial sustainability and the breadth of outreach as measured by the number of borrowers in support of the Institutionalists' approach. Zerai and Rani (2011) additionally found no evidence of a trade-off between financial sustainability and the breadth of outreach when measured using the average loan size and the proportion of women in the loan book indicating that there is no evidence of mission drift. The findings of Zerai and Rani (2011) of a neutral trade-off were later supported by Martínez (2015) whose study utilised data of 415 MIX reporting MFIs for the period 2003 to 2012. That study employed the instrumental variables technique and found no evidence of a trade-off between doing well (achieving financial sustainability) and doing good (increasing outreach depth). Depth of outreach was measured using the percentage of women borrowers and financial performance was proxied using operational self-sufficiency. Financial sustainability was favoured by a high average loan balance, productive staff members, real yield on the gross loan portfolio and price differential.

Bassem (2012) used data for the years 2008 to 2011 of a sample of 73 MIX reporting MFIs drawn from 10 countries across the MENA region. The GLS technique was adopted in the estimation process. Financial performance as measured by the return on assets, return on

equity and operational self-sufficiency had a neutral relationship with outreach as measured by the percentage of female borrowers denoting that there is no trade-off between financial performance and outreach. Increasing the size of operations was found to be negative with the percentage of female borrowers thereby indicating mission drift. Nonetheless, the NGO modality and the group lending methodology were positive with the percentage of female borrowers suggesting that there is no diversion of focus from the original mission of the MFIs. Using the social range index as the outreach measure resulted in negative operational self-sufficiency, insignificant return on assets and a positive return on equity. The results on the group lending methodology corroborated those found in the percentage of female borrowers' models but the results were otherwise for the size coefficient.

Kipesha and Zhang (2013) studied 47 MIX reporting MFIs from 5 countries across Eastern Africa between 2008 and 2011 to test whether trade-offs exist between financial and social performance measures. The study used a combination of fixed effects and random effects models. The Welfarists' models adopted the average loan balance divided by the GNI per capita, percentage of female borrowers and logarithm of the number of active borrowers as the dependant variables. The Institutionalists' models adopted operational self-sufficiency and the return on assets as dependent variables. The control explanatory variables included the cost per borrower, debt to equity, operating expenses, yield on the gross loan portfolio, loan loss rate and the number of products and services. They concluded that the trade-offs between outreach and financial performance measures (operational self-sufficiency and return on assets) depend on the variables used, model specification and the approach followed; Welfarism or Institutionalism. Other conclusions from that study were that high operating costs characterise the outreach programs of East African MFIs as the cost per borrower and the operating expenses ratio were positive in the Welfarists' models. Financial leverage was found to favour outreach depth and breadth.

Wijesiri *et al.* (2015) conducted a study on how age and size impact the outreach-financial sustainability relationship using a two-stage Data Envelopment Analysis bootstrapped metafrontier approach for 420 MIX reporting MFIs using data for the year 2013. The inputs of the model were operating expenses and the number of personnel while the outputs were the gross loan portfolio, financial revenue, inverse of the average loan balance and the number of active borrowers. The environmental variables included MFI age and size. Their findings revealed that aging MFIs achieve financial sustainability better than the younger ones but they fall short in pursuing the outreach objective. In terms of size, older microfinance

providers were found to outperform the younger ones in achieving outreach and financial sustainability goals. Thus, the findings of Wijesiri *et al.* (2015) were consistent with those of Marr and Awaworoyi (2012) who discovered that low levels of outreach are recorded by mature and regulated MFIs.

Bayai and Ikhide (2016b) sampled 60 MIX reporting MFIs from the Southern Africa Development Community (SADC) and used an unbalanced panel dataset for the period 2006 to 2012 in an attempt to link the depth and breadth of outreach to financing structure variables. The univariate multiple linear regression in the panel framework was used as the estimation technique. Their study unearthed that shunning donations to rely on financial leverage in an attempt to attain financial sustainability limits the ability of the MFIs to deepen and broaden outreach. The average loan size measured the depth of outreach while the number of active borrowers measured the breadth of outreach. That study also reported that new MFIs perform goodly on the depth of outreach dimension in line with the findings of Wijesiri *et al.* (2015). Furthermore, the study favoured that MFIs should engage in deposit mobilisation if they are to deepen and broaden their outreach activities.

El-Maksoud (2016) evaluated the performance of MFIs in the MENA region through the Generalised Method of Moments (GMM) from a balanced panel dataset of 124 MIX reporting MFIs for the period 2004 to 2011. That study found no evidence of mission drift as the depth of outreach measures (average loan size and the proportion of female borrowers) and the breadth of outreach measure (number of active borrowers) were insignificant with profitability as measured by operational self-sufficiency. These findings are supported in the prior work of Zerai and Rani (2011) and Martínez (2015). This conclusion gives the impression that both outreach and financial sustainability can be pursued at the same time. That study also found that the external environment significantly influences the performance of MFIs.

Xu *et al.* (2016) used a combination of fixed effects and random effects models to examine a global sample of 218 MIX reporting MFIs from 76 countries for the years 2001 to 2011. The average loan balance per borrower divided by the GNI per capita was the dependent variable and the main explanatory variable was financial performance proxied using operational self-sufficiency. The MFI specific controls included age and scale while the country-specific controls included domestic credit to the private sector, foreign direct investment, inflation, availability and quality of credit information and the percentage of the rural population. Evidence of mission drift was found as the average loan balance per borrower

divided by the GNI per capita was positive and significant with operational self-sufficiency. No significant relationship was found between the depth of outreach and the percentage of people living in the rural areas. Further evidence of mission drift was found between the average loan balance per borrower divided by the GNI per capita with domestic credit to the private sector and the shares in the GDP of net foreign direct investment. Following these findings, Xu *et al.* (2016) concluded that the depth of outreach is influenced by both MFI and country specific variables.

Earlier evidence on the effect of country specific macro-economic controls on the depth of outreach was reported by Ahlin *et al.* (2011) who studied 329 MIX reporting MFIs from 70 countries across the seven world's sub-regions for the years 1996 to 2006 using a pooled linear regression model. Their findings were that performance of MFIs (financial sustainability, default rates and growth in loan size) is improved by economic growth. They also found a positive and significant association between foreign direct investment and the depth of outreach as proxied by the average loan size; and a negative and significant relationship between the depth of outreach with the manufacturing share in GDP and the labour force participation rate. Weak evidence was found between private sector credit and financial sustainability but private sector credit led to a reduction in operating costs, default rates and interest rates. Remittances favoured financial sustainability and improved default rates.

Abdulai and Tewari (2017a) carried out a study on the determinants of outreach in SSA using an unbalanced panel dataset from the MIX on 71 MFIs selected from 10 countries across SSA for the years 2003 to 2013. The random effects model was used in the estimation process. Outreach depth was measured using average loan size and the percentage of female borrowers while outreach breadth was measured using the number of active borrowers. Operational self-sufficiency was insignificant with all the three measures of outreach indicating that financial sustainability does not drive the outreach programs of the SSA MFIs. A positive and significant portfolio at risk coefficient was reported with outreach depth (average loan size) indicating that increased focus on the pro-poor leads to deterioration of loan portfolio quality but broadening outreach improves it. The productivity of the loan personal reduced as outreach was deepened but increased with outreach breadth. Operating expenses and profitability measured using the return on assets were also found to be negative with the average loan size but positive with the percentage of female borrowers.

A dynamic panel data study for the years 2005 to 2014 was conducted by Amin *et al.* (2017) upon sampling 405 Latin American MIX reporting MFIs across 21 countries using the GMM estimator. Their objective was to examine the impact of outreach on profitability. Profitability was measured using the return on assets while outreach depth was measured using the average loan balance and outreach breadth was measured using the number of active borrowers. The MFI-specific controls included the regulation dummy, charter type, offices' coverage, financing structure, age, number of diamonds and size. The macroeconomic controls included the real GDP and the number of MFIs per country. Their findings were that the breadth of outreach is negatively related to profitability thereby contradicting the Institutionalists' view. That study also concluded that there is a compatible relationship between profitability and the depth of outreach thereby contradicting the Welfarists' view. This indicates that an increase in the average loan size leads to an increase in profitability suggesting that mission drift has occurred. Profitability was also increased by the number of MFIs and capital adequacy. All the charter type variables were not significant in explaining profitability but size, number of diamonds, real GDP and regulation status reduced profitability.

Reichert (2018) conducted a meta-analysis study of 61 studies in an attempt to examine the nature of trade-offs in microfinance. The study noticed that attainment of the dual mission of MFIs is a highly debated topic in empirical literature and it affects three forms of outreach; cost, depth and breadth. Furthermore, the analysis noticed that are three sets of studies: those that exhibit the existence of trade-offs, those that refute the existence of trade-offs and those that exhibit synergies between outreach and financial performance. Overall, Reichert (2018) found that trade-offs are catalysed by outreach depth proxied by the average loan size, outreach cost proxied by the yield on the loan portfolio and efficiency as measured by cost per borrower, operating expenses and total expenses. On the contrary, risk, as measured by portfolio at risk results in fewer trade-offs while focusing on women clientele and profitability as measured by the return on assets and return on equity, do not exhibit trade-offs. Also, study artefacts such as using an economic frontier methodology and publications in development journals were found to have a positive bearing on the prevalence of trade-offs.

Lam, Zhang, Ang and Jacob (2019) applied the seemingly unrelated regressions to investigate whether there is a reciprocal relationship between financial performance and social performance. They used data of 852 MIX reporting MFIs sampled across 96 countries for the years 2005 to 2012. Financial performance was measured using the return on assets while social performance was measured using the average loan size. That study did not find a reciprocal

relationship between the two measures of performance for their full sample. However, when they disaggregated the sample by profit status, they found contradicting results. They found that financial performance contributes positively to social performance in profit-oriented MFIs than in non-profit-oriented MFIs. Additionally, they found that social performance contributes positively to financial performance in non-profit-oriented MFIs than in profit-oriented MFIs. Based on these findings, Lam *et al.* (2019) concluded that profit-oriented MFIs are different from the non-profit-oriented MFIs in pursuing the double bottom-line objectives. Also, both types of MFIs have to learn from each other over time on how they can improve their pursuit of the dual mission.

A closer look into all these previous studies discussed above amongst others, reveals that the outreach-financial sustainability relationship varies across locations and depends on the variables used to measure outreach, model specification and the goals to be achieved. It is for this reason that Bayai and Ikhide (2016b, p. 285) argued that "the exact nature of trade-offs in microfinance differ across regions, but meaningful trade-offs need to be recognised and weighted everywhere". This study therefore intends to fill the literature gap by focusing on the outreach-financial sustainability relationship based on deposit-taking measures on outreach depth and breadth. This is done to examine whether there is any evidence of mission drift or a trade-off in the depository microfinance sector of the LISSA countries. The deposit-taking perspective on the outreach-financial sustainability debate has not yet been investigated. Therefore, this study adopts the average deposit balance/GNI per capita as the proxy for the depth of outreach following the Welfarists' view while the logarithm of the number of voluntary depositors is adopted as the proxy for the breadth of outreach following the Institutionalists' view. This way, this study distinguishes itself from the previous studies that have looked at the outreach-financial sustainability relationship that measured the depth and breadth of outreach from a microcredit perspective. As revealed in the empirical microcredit perspective studies discussed above, the depth of outreach was mainly measured using the average loan size while the breadth of outreach was measured using the number of active borrowers.

Another novel feature of the present study is that it exclusively focussed on the outreach-financial sustainability nexus of DTMFIs as compared to previous studies whose samples were a mixture of both DTMFIs and COMFIs. Using this approach, the previous studies measured outreach based on lending variables. The approach followed in the empirical studies gives the impression that the determinants of financial sustainability of both the

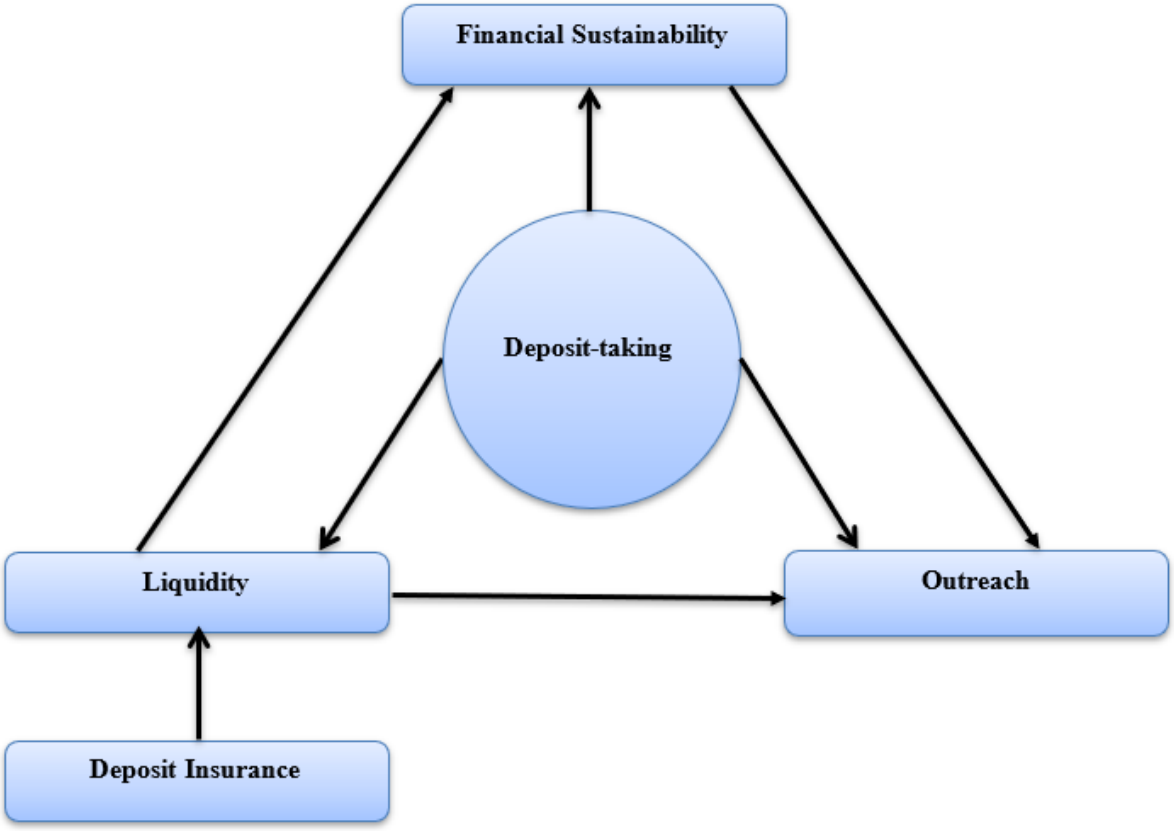
DTMFIs and the COMFIs are the same and that microfinance outreach is only credit-focused. As noted in section 3.2.2 above, DTMFIs and COMFIs don't operate with the same constraints given the extra supervisory costs that are linked to deposit attraction (Robinson, 2004; Ledgerwood and White, 2006).

The next section outlines the conceptual framework for the study.

3.5 Conceptual Framework

Figure 3.1 is an illustration of the conceptual framework for this study.

Figure 3.1: The conceptual framework for the study



Source: Author's diagram based on literature review

A critical review of the literature discussed above shows that there are interrelated links between financial sustainability, liquidity and outreach as a result of the deposit-taking process by the DTMFIs. These interrelationships are shown in the conceptual framework illustrated above by use of arrows. The boxes represent the main pillars of this research study which are financial sustainability, liquidity and outreach. Deposit insurance is also represented using a box. Deposit-taking is at the heart of achieving the financial and social performance objectives

of DTMFIs and therefore, the circle that represents the deposit-taking process is placed at the centre of the conceptual framework of this study. As discussed earlier, several empirical writers have argued that deposits are a means of achieving financial sustainability (Brom, 2009; Dokulilova *et al.*, 2009; Ek, 2011; Hulme and Aran, 2011; Millson, 2013; Kaloo, 2015; Bayai and Ikhide, 2016a), hence the arrow that points to the financial sustainability box from the deposit-taking circle. Once financial sustainability has been achieved, DTMFIs are envisaged to live long in ensuring the continual delivery of micro-financial products and services through their outreach programs and this is captured by the arrow that starts from the financial sustainability box ending at the outreach box.

Through deposit-taking, DTMFIs also provide liquidity to their customers by intermediating the mobilised deposits into loans as shown by the arrow that points to the liquidity box from the deposit-taking circle (Brom, 2012). Moreover, as the DTMFIs satisfy the liquidity needs of their clientele, they are in a way, fulfilling their social mission of outreach (de Sousa-Shields and Frankiewicz, 2004; Simtowe, 2008). The arrow that moves from the liquidity box to the outreach box sheds light on the relationship between liquidity and ountreach. However, for the DTMFIs to even out their liquidity requirements in the financial intermediation process (Sealey and Lindley, 1977; Werner, 2014), they have to insure the deposits that they intermediate as a safeguard against panic withdrawals and bank runs (Riquet and Poursat, 2013). Therefore, deposit insurance is inevitable in the operation of DTMFIs. The arrow that extends from the deposit insurance box to the liquidity box illustrates this point.

Empirical studies also show that a positive link exists between liquidity and financial sustainability (Roodman and Quereshi, 2006; Tulchin *et al.*, 2009). This means that liquid DTMFIs are usually financially sustainable indicating that short term financial performance (liquidity) complements long term financial performance (financial sustainability). This relationship is indicated by the arrow that moves from the liquidity box to the financial sustainability box. However, the relationship between liquidity and financial sustainability is outside the scope of this study. Finally, the arrow that connects the deposit-taking circle and the outreach box represents the custom-made deposit products and services such as savings and current accounts that DTMFIs create to meet the depositors' savings needs.

3.6 Conclusion

The primary goal of the Sustainable Development Goals of the United Nations of eradicating extreme poverty by the year 2030 through microfinance can only be achieved if the microfinance providers are financially sustainable, liquid and reach out to the poorest in their vast numbers through deposits and a wide array of financial services profitably. For this reason, this chapter reviewed the conceptual, theoretical and empirical literature on these three forms of analysing the performance of the LISSA DTMFIs. Financial sustainability focuses on long term financial performance and liquidity focuses on short financial performance. Outreach is a social performance measure.

Chapter four, which is next, discusses the research methodology which was employed for answering the study's research questions and objectives that were outlined in Chapter one.

CHAPTER FOUR:
RESEARCH METHODOLOGY

4.1 Introduction

This chapter is the research methodology section which outlines how the research was carried out in addressing the research questions and objectives of the study that were discussed in Chapter one. In this chapter, the research methodology is divided into three sections. The first section is 4.2 which highlights the data, variables and the econometric method (probit model) that were used to examine the first objective of the study: to understand why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability. Section 4.3 which is next, discusses the data, variables and the random effects model that was used for finding answers for the second objective of the study: to assess the relationship between liquidity and deposit insurance in the depository microfinance sector of the LISSA countries. Section 4.4 is a discussion of the data, variables and the estimation technique (System Generalised Method of Moments) that were used for examining the third objective of the study: to examine whether there is any evidence of mission drift or trade-off in the LISSA's depository microfinance sector in the pursuit of outreach and financial sustainability goals. Section 4.5 which is last, is a summary of the chapter.

4.2 Research Approach and Design

The three objectives of the study were quantitative, therefore, the research approach followed was also quantitative. The quantitative research approach followed, relied on statistical and econometric methods in addressing the research questions or objectives. A longitudinal research design was adopted as the study was based on panel data.

4.3 Examining Deposits and Financial Sustainability of LISSA DTMFIs

4.3.1 Data

The first objective of the study was to understand why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability despite having huge volumes of deposits.

The author relied on two sources of data; the Microfinance Information Exchange (MIX) for data on the DTMFI-specific variables and the World Governance Indicators (WGIs) for data on the country-specific variable, regulatory quality.

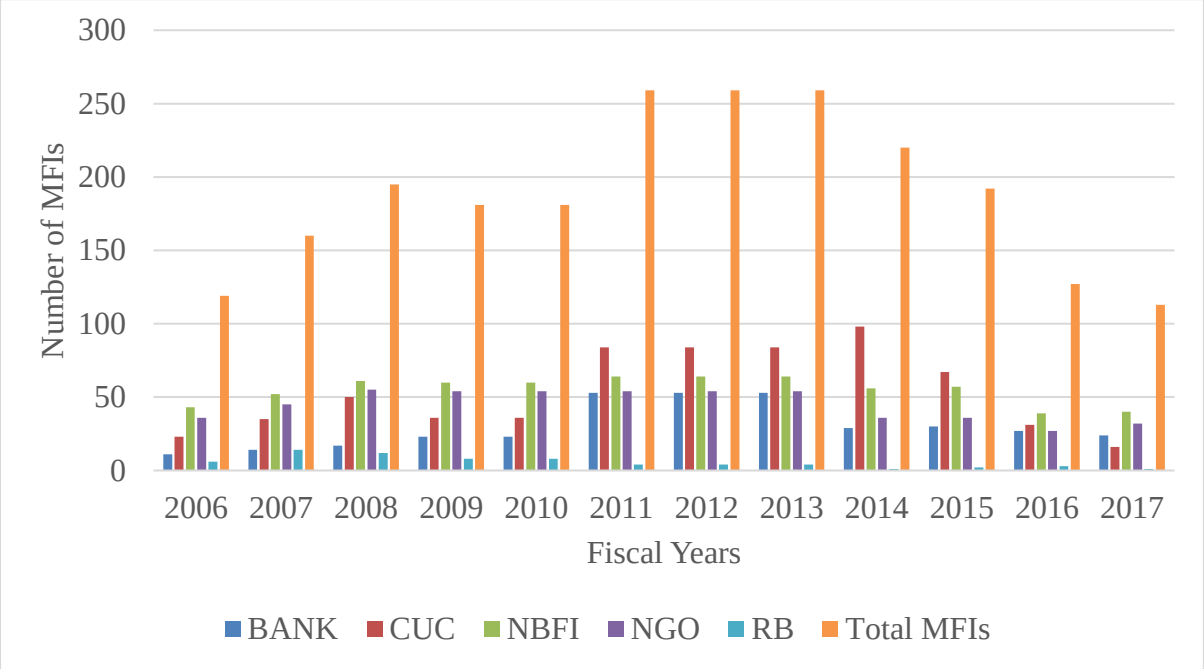
i. Microfinance Information Exchange

The first objective of the study utilised an unbalanced panel dataset that spanned the period 2006 to 2017, that was extracted from the MIX online database where the data were accessed through a periodic subscription. This time period was chosen because this was the period when most data were available and this is the time period when the DTMFIs recorded phenomenal growth in deposits as explained in section 2.4.4. Data from the MIX are in the form of adjusted financial ratios. The MIX data was adopted because it is currently, the most available and public source of data on MFIs' financial and social performance. MFI-specific data is not easy to access from the MFIs and the supervisory institutions in their jurisdictions as most of the MFIs are private limited companies which are not obligated to publish their annual financial statements. The MIX database has been the prime source of data for several microfinance studies over the years (Vanroose and D'Espallier, 2013; Janda and Zetek, 2014; Abdulai and Tewari, 2016; Bayai and Ikhide, 2016b; D'Espallier *et al.,* 2017). MFIs report voluntarily to the MIX. Since it is not mandatory for all MFIs across the globe to periodically report to the MIX, the data extracted from this database suffer from self-selection bias as the available data are only for voluntary reporting MFIs. Thus, the MIX's data are not representative of all the MFIs across the globe (Lensink *et al.*, 2018).

The reliability of data from the MIX is enhanced through standardised reporting and that most of the world's largest MFIs with very high outreach numbers and high rating scores report to the MIX. Reporting inconsistencies by the MIX-reporting MFIs results in missing values in some periods which therefore distorts the quality of the data and this also results in unbalanced panel datasets (Barnett, 2011). As Zamore (2018) noted, most of the datasets in the microfinance sector suffer from imperfection. Nonetheless, the allowable number of missing values of the data of the sampled DTMFIs in this study was set at not-more-than 40 % of the data points so as to enhance the validity of the data for the adequacy of the estimated results.

Figure 4.1 shows trends in the population or total number of the MIX-reporting MFIs from SSA by charter type and in total for the years between 2006 and 2017.

Figure 4.1: Trends in the number of MIX-reporting SSA MFIs by charter type and in total for the years between 2006 and 2017



Source: Compiled by the author using data from the MIX's annual reports for the years between 2006 and 2017

The levels of the troughs and peaks shown in Figure 4.1 that indicate the number of MFIs by charter type[24] and in total for each year from 2006 to 2017 are explained in Table 4.1 below which shows the actual numbers on the distribution of the sample over time. The NBFIs were the most dominant type between 2006 and 2010 and this could be attributable to their increased impetus towards commercialisation (Bayai, 2017). Across all the years between 2006 and 2017, growth in the number of NBFIs exhibited slight variations when compared to the rest of the charter types while the number of rural banks was the lowest across all the years. The NGOs are the second dominant type between 2006 and 2010 and were overtaken by the CUCs in 2011 until 2016 only to reclaim their initial position in 2017. The number of CUCs rose steadily between 2006 and 2008 and dropped in 2009 and 2010 only to rise sharply in 2011 to become the dominant charter type since then until 2015. Between 2006 and 2016, the banks lagged behind the CUCs, NGOs and the NBFIs but in 2017, the banks only overtook the CUCs.

[24] For additional inferences, explanations on the trends in the number of MFIs by charter type in this section can also be compared to those in section 2.4.4.(ii).

Table 4.1: Distribution of MIX-reporting SSA MFIs by charter type and in total for the years between 2006 and 2017

Fiscal Years	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
BANK	11	14	17	23	23	53	53	53	29	30	27	24
CUC	23	35	50	36	36	84	84	84	98	67	31	16
NBFI	43	52	61	60	60	64	64	64	56	57	39	40
NGO	36	45	55	54	54	54	54	54	36	36	27	32
RB	6	14	12	8	8	4	4	4	1	2	3	1
Total MFIs	**119**	**160**	**195**	**181**	**181**	**259**	**259**	**259**	**220**	**192**	**127**	**113**

Source: Compiled by the author using data from the MIX's annual reports for the years between 2006 and 2017

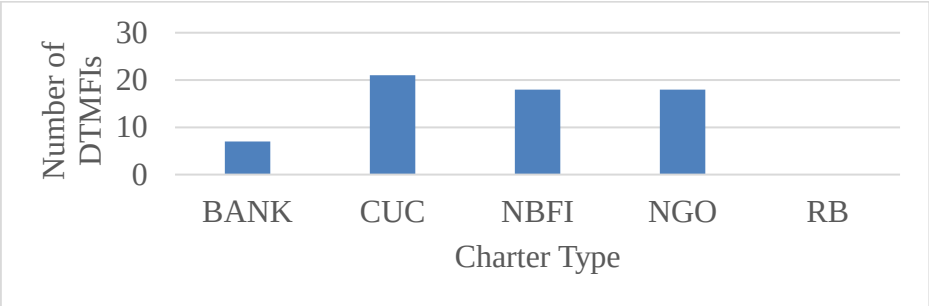
In 2006, 119 MFIs from SSA self-reported their financial and social metrics to the MIX. The total number of reporting MFIs increased from one year to the next between the years 2006 and 2008 due to the fusion of organisations such as Greenfield Institutions into the sector as explained in section 2.6.4. The slight drop in the total number of MFIs from 195 in 2008 to 181 in 2009 is attributed to the impact of the Global Financial Crisis which hit the sector as some of the MFIs struggled to withstand the global shock (refer to Figure 2.14). As the MFIs were coming out of the financial crisis, the total number of MFIs reporting to the MIX skyrocketed to 259, the highest total number of MFIs ever reported by the SSA MFIs. The levelling of the total number of reporting MFIs (2009 and 2010; 2011 to 2013) is due to the data that were not reported in the annual reports for the years 2010, 2012 and 2013[25]. According to the MIX and CGAP (2012, p. 4) report, when data is not available in a particular year, "data from the most recent prior period is used" for reporting in that period. Using this criterion, Figure 4.1 and Table 4.1 show that the total number of MFIs in 2010 was that of the year 2009 and the total number of MFIs in 2012 and 2013 was that of the year 2011. The decline in the total number of MFIs that reported data to the MIX for the years 2012 and 2013 was not only in experienced in SSA but also across the rest of the global subregions (Cloet and Moyaert, 2014). Consequently, the total number of SSA MFIs reporting to the MIX dropped to 221 in 2014; 193 in 2015; 127 in 2016 and to its lowest record of 113 in 2017.

[25] This point does not mean that raw data for the sample used in this study could not be obtained from the MIX in the years 2010, 2012 and 2013. Figure 4.1 and Table 4.1 are based on the figures extracted from the MIX's annual subregional reports for SSA and not on raw data for the individual financial service providers that were included in the sample for this study.

Since MIX-reporting MFIs exhibit inconsistencies in the submission of annual financial data, Barnet (2011) conducted a comprehensive study that investigated why MFIs in SSA have difficulties in submitting annual financial data to the MIX. The study revealed the following reasons amongst others: a lot of time spent in preparing different reports in varied formats for different stakeholders, differences in applications used for data capturing and synthesis and inadequate real time systems for reporting across MFIs' branch network.

In light of the background given above, purposive sampling was done so as to obtain the sample for the study. The DTMFIs were easily identified by searching for all the MFIs that had data on deposits during the period under study. This exercise enabled the researcher to distinguish between the DTMFIs which reported data on deposits and the COMFIs which did not report data on voluntary deposits[26]. Additionally, purposive sampling enabled the selection of DTMFIs based on the completeness of their data or their high level of information disclosure which is measured by a five-point diamond scale. DTMFIs with 3 to 5 diamonds have very high levels of information disclosure unlike those with 1 to 2 diamonds. Thus, selecting DTMFIs with high information disclosure scores helped to minimise the problem of missing values. After purposive sampling, only 64 unevenly distributed DTMFIs from 18 out of 27 LISSA countries were included in the sample. Therefore, the sample consisted of DTMFIs that were consistent in reporting their annual financial statements between the years 2006 and 2017. The 18 LISSA countries included in the sample were those countries where the sampled DTMFIs operated from. Figure 4.2 shows the sample of the selected DTMFIs by charter type.

Figure 4. 2: Sampled DTMFIs by Charter Type



Source: Compiled by the author using data from the Microfinance Information Exchange

[26] The exact number of COMFIs in the population was not determined as these institutions were not the focus of the present study. Moreover, it is important to note that where COMFIs report deposits, those deposits are called compulsory deposits and not voluntary deposits. The distinction between compulsory and voluntary deposits was discussed in section 2.4.1. As indicated earlier, deposits in this study refer to voluntary deposits.

Figure 4.2 shows that the sample consisted of 21 CUCs which were the most dominant charter type, 18 NBFIs, 18 NGOs and 7 BANKs. No RBs were included in the sample. As explained above, the criterion for the DTMFIs to be included the sample was the completeness of their data or their high level of information disclosure. The full list of the sampled DTMFIs and their additional details such as name, country of origin, sub-region, age and number of diamonds are shown in Appendix 4.

ii. World Governance Indicators

The study also utilised data from the World Governance Indicators which are aggregate and individual governance annual time series indicators for the years 1996 to 2017 for more than 200 countries across the world. The data exchange for the WGIs provides six dimensions of governance; voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. This study only focussed on one dimension of governance, regulatory quality for 18 LISSA countries whose DTMFIs were included in the sample. The regulatory quality variable was chosen because DTMFIs are regulated financial service providers which handle deposits (other people's money or savings which are at risk of being abused or subject to fraudulent or criminal activities). Regulatory quality measures how enabling, restrictive and effective are the policies formulated by different regulatory authorities worldwide. Regulatory quality is measured using estimates of governance that range from -2.5 (weak governance) to +2.5 (strong governance). The reliability and validity of the WGIs lies in the fact that they are reported by the World Bank and that they are the only currently available, best source of data on governance issues across the globe. Hence, some prior microfinance studies also relied on data from the WGIs (Cull *et al*., 2009b; Ahlin *et al*., 2011; Abdulai, 2017).

4.3.2 Variables

i. Financial Sustainability: *Operational Self-Sufficiency (OSS)*

The outcome variable is *Operational Self-Sufficiency (OSS)*, the proxy for financial sustainability. Operational self-sufficiency measures the ability of the DTMFIs to cover their operational and non-operational costs from the income generated from their normal trading operations. Following the prior work of Bogan (2012), Tehulu (2013) and Bayai and Ikhide (2018) and in concurrence with the MIX's definitions, this study treated financial sustainability as a dichotomous variable which took the value of 1 if the DTMFI is financially sustainable,

and 0 otherwise. The DTMFIs are financially sustainable if the OSS ratio is greater than 100 % and are not financially sustainable if the OSS ratio is less than 100 %.

ii. Scales of Operation: {*Small Scale Deposits (SMALL), Medium Scale Deposits (MEDIUM) and Large Scale Deposits (LARGE) dummies*}

According to the MIX, the operational scale is divided into two categories, outreach scale and institutional scale (MBB, 2000; 2007; MIX and CGAP, 2012). The scale of outreach is measured using the total number of borrowers served. Small scale MFIs have less than 10 000 active borrowers and medium scale MFIs have 10 000 to 30 000 active borrowers and large-scale MFIs have more than 30 000 borrowers. The institutional scale is measured in terms of the volume of the gross loan portfolio which exhibits variations across the 6 MIX's geographical regions. A small-scale MFI has a gross loan portfolio of less than US$2m across all regions except in Latin America and the Caribbean (LAC) where small-scale MFIs have a gross loan portfolio of less than US$4m. For medium scale MFIs, the gross loan portfolio ranges between US$2m to US$8m except in the LAC where it ranges between US$4m to US$15m. A large-scale MFI has a gross loan portfolio which is more than $8m except in the LAC where the gross loan portfolio is more than US$15m. In some instances, the institutional scale has been measured using the total assets held by the MFIs (Ngo, 2013).

Prior studies that incorporated institutional scale in their estimation models include Ngo *et al.* (2014), Xu *et al.* (2016) and Nwachukwu *et al.* (2018). All these studies used the volume of the gross loan portfolio as a measure of the scale of operations. Given the enormous deposit volumes that are mobilised by DTMFIs in SSA, this study distinguishes itself from the aforementioned empirical works by measuring institutional scale using the volumes of deposits. This study followed the MIX's definitions on the scale of lending operations to define the scale of deposit operations. Small scale DTMFIs are those that have less than US$2m worth of deposits. Medium-scale DTMFIs have deposit volumes that range between US$2m and US$8m. Large scale DTMFIs have deposit volumes in excess of US$8m. Thus, the scales of deposit operations were captured using categorical values. Using the scales of deposits dummies as the main independent variable was an attempt to explain why the LISSA's depository microfinance sector has been falling short in attaining financial sustainability despite the commendable growth in deposits volumes they mobilise. As a robustness check, another probit model was estimated using the scale of lending operations based on the gross loan portfolio scales which were discussed above.

iii. Experience: *Number of Years of Operation (AGE)*

Age relates to the number of years the DTMFIs have been operational since their establishment. Age is an indicator of experience in deposit-taking. Over time, a couple of microfinance studies have considered the age variable in their econometric estimation models (Churchill and Marr, 2014; Johnson, 2015; Abdulai and Tewari, 2016; Xu *et al.*, 2016). This study postulated a positive relationship between age and financial sustainability.

iv. Size: *Logarithm of Total Assets (lnASSETS)*

The size of the DTMFIs relates to how big these institutions are in terms of their total assets (Bassem, 2009; Mersland and Strøm, 2010; Tehulu, 2013; Johnson, 2015; Chikalipah, 2017). According to Wijesiri *et al*. (2015), the size of the MFIs is indicative of three factors; their ability to withstand market competition, the awareness of these institutions and their advances in technological development, diversification and investment opportunities. The logarithm of total assets *(lnASSETS)* was expected to impact financial sustainability positively. The rationale for using the logarithm of assets is that "the logarithm function normalises the distribution" (Johnson, 2015, p. 133). Several prior studies also used the logarithm of total assets as the proxy for size (Bogan, 2012; Tehulu, 2013; Johnson, 2015; Xu *et al*., 2016; Bibi *et al.*, 2018; Zamore, 2018).

v. Charter Type: *Legal Status (BANK, CUC, NBFI and NGO)*

The charter type relates to the form of legal entity the MFIs are registered under. The MIX categorises MFIs into four main categories of charter type; bank (BANK), Non-Governmental Organisations (NGOs), Non-Bank Financial Institutions (NBFIs) and Credit Unions/Cooperatives (CU/C). The legal form of the MFIs has implications for deposit mobilisation. Cooperatives mobilise high volumes of deposits as they rely on them for equity and investment purposes (MIX, 2006; Shaoyan and Duwal, 2012). NGOs are less involved in deposit-taking as most governments have traditionally restricted them to do so (D'Espallier *et al.*, 2017). For the downscaling BANK-DTMFIs, it is easier to mobilise deposits from the poor and the low-income households based on their existing infrastructure when entering this niche market. NBFI-DTMFIs are equally able to build a large deposit base. The effect of charter type on the financial sustainability of the DTMFIs therefore varies with the form of the legal entity. Since the charter type variable was categorical, dummy variables were assigned to each charter type. The NGO charter type was adopted as the base category. Previous studies by Quayes

(2012), Vanroose and D'Espallier (2013), Johnson (2015), Wijesiri *et al.* (2015) and Lensink *et al.* (2018) also used the charter type dummies.

vi. Efficiency: *Operating Expenses to Total Assets (OEA)*

The operating expenses ratio is a reflector of how the providers of microfinance can control their administrative costs and personnel costs that arise in the ordinary course of their core business. Cost-effective DTMFIs can keep the operating expenses ratio at minimum levels to keep the operating revenues and profits at the maximum possible levels. Several previous studies measured the operating expenses ratio by comparing the operating expenses to the gross loan portfolio because those studies mainly focussed on microlending operations (Cull *et al.*, 2009b; Lensink *et al.*, 2018; Nwachukwu *et al.*, 2018). Nevertheless, since the DTMFIs leverage on their assets in mobilising deposits which they intermediate into loans, it is more meaningful to use the operating expenses to the total assets as a proxy for efficiency in investigating the relationship between the scales of deposits and financial sustainability. Thus, the operating expenses to total assets ratio enables the DTMFIs to compare the yield earned on the gross loan portfolio and how much they spend in the intermediation process using their total assets (Rosenberg, 2009). Mobilising small, variable and volatile deposits from the poorest customers or those residing in hard to access areas such as the most parts of LISSA countries is most likely to increase the operating expense ratio. This decreases the DTMFIs' chances of self-sufficiency. A negative a priori sign was therefore assigned.

vii. Loan Impairments: *Loan Loss Provisions (LLP)*

Based on business discretion, MFIs set aside a fixed or variable percentage of their pre-operational expenses and tax revenues as a shield against anticipated and unexpected loan delinquencies. Hessou *et al.* (2019) noted that loan loss provisions are amended as business cycles change indicating that the institutions that provide microfinance should accumulate sufficient loan loss buffers that can enable them to withstand loan defaults during economic downturns. Nwachunkwu *et al.* (2018) reported that increasing the loan loss provisions drives MFIs to increase their lending interest rates. This is done so that the MFIs remain profitable thereby boosting their financial sustainability. A negative a priori sign was assigned as the loan loss provisions are more likely to reduce the likelihood of the LISSA DTMFIs' self-sufficiency.

viii. Coverage: *Number of Offices (NOF)*

The distribution of the DTMFIs across their national jurisdictions is reflected by the number of offices or branches that they have. An extensive network of offices or branches ensures a wider coverage but this is a costly exercise as large amounts are channelled towards capital and revenue expenditure in setting up and maintaining the offices. An extensive coverage also constrains the productivity of the providers of microfinance as they have to deal with enormous volumes of new and unknown or remote clientele at the expense of financial and human resources (Twaha and Rashid, 2013). A negative a priori sign was assigned.

ix. Financing Costs: *Financial Expenses to Total Assets (FETA)*

The financing of corporates comes at a cost to the recipients of the capital funds. Evidence from the MIX Market reveals that DTMFIs in SSA are largely financed through deposits than any other available or alternative sources of finance such as equity, debt, subsidies and donations (MIX, 2019). Deposits are a relatively cheaper source of finance because the DTMFIs themselves largely determine the interest rates that they are willing to pay the depositors for the use of their funds in the financial intermediation process (Lützenkirchen and Weistroffer, 2012). Usually, very low interest rates are paid to the depositors. For this reason, a positive a priori sign was assigned in an attempt to explain how the financial expenses ratio accounts for the likelihood of the financial sustainability of the LISSA DTMFIs.

x. Financial Revenue: *Real Yield on the Gross Loan Portfolio (YoGP)*

In the provision of financial services and products of relatively micro amounts, interest, fees and commissions are charged so that financial revenue is generated. According to the MIX, adjustments for inflation are made to the financial revenue generated to obtain the real yield on the gross loan portfolio. Financial revenue being the main source of revenue from the normal trading operations of the institutions that are involved in the provision of microfinance is envisaged to boost their financial sustainability (D'Espallier *et al.*, 2017; Klomp, 2018). A positive a priori sign was therefore assigned.

xi. Risk and Portfolio Quality: *Portfolio at Risk > 30 days (PAR)*

Low-income earners and the poor are largely excluded by the mainstream banking system partly because they are considered as very risky clients. In low-income countries where financial development is very low, it is difficult to obtain information on the creditworthiness

of the potential and existing clients as the credit reference agencies are limited or are non-existent in some cases. Formal documents on assets owned which are considered as bankable are in the hands of a few. Sources of income for loan repayments are sometimes abrupt, especially for the subsistence farmers. Thus, high default risk is most likely to cripple the financial sustainability of the LISSA DTMFIs (Lensink *et al.*, 2018; Tchakoute-Tchuigoua and Soumare, 2019). A negative a priori sign was therefore allotted.

xii. Regulation: *Regulatory Quality (REGQ)*

DTMFIs are regulated institutions, therefore the study incorporated the regulatory quality proxy in the empirical model to capture the effectiveness of the regulatory framework of the countries under study. However, the scope of the regulation varies across the different DTMFI charter types as they are not governed by the same regulatory board (refer to section 2.4.2). Therefore, to capture the regulation of the DTMFIs under the same umbrella, the study adopted the country level regulatory quality variable since it accommodates all the DTMFIs regardless of their charter type and governing body. The impact of regulatory quality varies since in some countries, regulation stifles the flexibility of the DTMFIs' operations and in other countries, it provides a level playing field. The regulators themselves may be overburdened when they do not have adequate resources to meet the ever-increasing number of DTMFIs and they may not be given sufficient discretion to act by their respective national governments. A negative a priori sign was therefore assigned. Microfinance studies by El-Maksoud (2016), Nyanzu and Perprah (2016) and Tchakoute-Tchuigoua (2016) included the regulatory quality variable in the estimation models.

Table 4.2 below provides a summary of the variables used to determine why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability.

Table 4.2 Summary of the variables used to understand why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability

	Variable	Measurement	Predicted Effect	Data Source
	Dependent Variable			
	Financial Sustainability: Operational Self-Sufficiency *(OSS)*	Dummy variable [1 = If the DTMFI is financial sustainable, and 0 otherwise]		MIX
	Independent Variables			
DTMFI Specifics	**Operational Scale**: Dummy variables *(SMALL, MEDIUM & LARGE)*	Volume of Deposits or Gross Loan Porftolio: Small Scale: 0 to US$2m, Medium Scale: US$2m to US$8m and Large Scale: over US$8m (base category: Medium Scale)	Indeterminate	MIX
	Experience: Age	Number of years of operation	+	MIX
	Size: Logarithm of the Total Assets *(lnASSETS)*	Natural logarithm of total assets adjusted for inflation and subsidized provisioning for loan impairment and write-offs	+	MIX
	Charter Type: Dummy variables *(BANK, CUC, NBFI & NGO)*	Classification of DTMFIs according to legal status: BANK, CUC, NBFI and NGO (base category = NGO)	varies	MIX
	Efficiency: Operating Expenses/Total Assets *(OEA)*	Total operating expense compared to average assets	-	MIX
	Loan Impairment: Loan Loss Provisions *(LLP)*	Impairment losses on loans, net of recoveries on loans written off, compared to average assets	-	MIX
	Coverage: Number of Offices *(NOF)*	Total number of offices or retail outlets	-	MIX
	Financial Revenue: Real Yield on Gross Loan Portfolio *(YoGP)*	Adjusted Yield on Gross Portfolio (nominal)-inflation rate/(1+inflation rate)	+	MIX
	Financing Cost: Financial Expenses/Total Assets *(FETA)*	Total financial expenses divided by average assets	+	MIX
	Risk & **Portfolio Quality**: Portfolio at Risk > 30 days *(PAR)*	The portion of loans greater than 30 days past due, including the value of all renegotiated loans compared to gross loan portfolio.	-	MIX
Country Specific	**Regulation**: Regulatory Quality *(REGQ)*	Perceptions of the ability of the government to formulate & implement sound policies & regulations that permit & promote private sector development	varies	WGI

Source: Compiled by the author based on literature review

4.3.3 Analysis Technique - Probit Regression

As empirical literature shows, the institutional providers of microfinance products and services are either financially sustainable or financially unsustainable (Bogan, 2012; Riquet and Poursat, 2013; Boateng *et al.*, 2016; Bayai and Ikhide, 2018). This indicates that the financial sustainability of DTMFIs is dichotomous. As Gujarati and Porter (2010, p. 179) noted, dichotomous variables "indicate the presence or absence of a quality or attribute". A DTMFI is financially sustainable when it has an operational self-sufficiency ratio of 100 % or more and is financially unsustainable when it has an operational self-sufficiency ratio of less than 100 %. 1 was assigned for a financially sustainable DTMFI and 0 was assigned for a financially unsustainable DTMFI. Thus, the probability that a DTMFI is financially sustainable is represented as p and the probability that a DTMFI is financially unsustainable is represented by $1-p$. According to Gujarati (2004), the econometric models that are appropriate for dealing with such dichotomous variables, inter alia, include; the linear probability model, logit model and the probit model. These three binary response models estimate the probability that the dependent variable *(Y)* equals one as a function of the explanatory variables *(X_i)* as shown in Equation 4.1:

$$p = pr\left[Y = 1 \,\middle|\, X\right] = F(X'\beta) \qquad (4.1)$$

where β is a vector of the model coefficients. Katchova (2013) noted that the main differences between the aforementioned three models lie in their functional forms. Equation 4.2 shows the functional form of the linear probability model:

$$p = pr\left[Y = 1 \,\middle|\, X\right] = X'\beta \qquad (4.2)$$

The linear probability model does not limit its estimated probabilities between 0 and 1 and its disturbances exhibit non-normality and heteroscedasticity (Gujarati, 2004). As a result of these limitations, the linear probability model falls short in predicting probabilities in binary response econometric modelling. This paves way for the supremacy of the logit and probit maximum likelihood regression models that limit the predicted probabilities between 0 and 1. Additionally, the predicted probabilities in these models vary in a nonlinear fashion with X_i. Gujarati (2004, p. 553) presented these two requirements for the validity of the logit and probit models this way:

… "(1) As X_i increases, $P_i = E(Y = 1 \mid X)$ increases but never steps outside the 0-1 interval, and (2) the relationship between P_i and is nonlinear, that is, 'one which approaches zero at slower and slower rates as X_i gets small and approaches one at slower and slower rates as X_i gets very large'".

The functional form of the logit model is the cumulative distribution function *(F)* of the logistic distribution:

$$P_i = \frac{1}{1+e^{-Zi}} \qquad (4.3)$$

where:

$$Z_i = \beta_1 + \beta_2 X_i \qquad (4.4)$$

Thus, as P_i behaves nonlinearly to Z_i and takes values between 0 and 1, Z_i ranges from - ∞ to + ∞. When P_i represents the probability that a DTMFI is financially sustainable, then the probability that a DTMFI is financially unsustainable$(1 - P_i)$ is given as:

$$1 - P_i = \frac{1}{1+e^{Zi}} \qquad (4.5)$$

$P_i\ /1 - P_i$ is the odds ratio in favour of a DTMFI being financial sustainable. The log of the odds ratio linearises the logistic model. Unlike the logit model which makes use of the logistic distribution as the cumulative distribution function *(F),* the probit model makes use of the standard normal distribution as the cumulative distribution function, *(ϕ).* Therefore, the functional form of the probit model is shown in Equation 4.6 as:

$$P_i = \phi\ (X'\beta) = \int_{-\infty}^{X\prime\beta} \frac{1}{\sqrt{(2\pi)}}\ \emptyset(2)d2 \qquad (4.6)$$

∅ is the density function of the standard normal variable. Theoretically, the logistic curve has slightly flatter tails than the probit curve (Gujarati, 2004). The differences in the functional forms of the logit and probit models make their coefficients differ. Generally, the magnitude of the model coefficients for the logit and probit models are not interpreted but their signs. More meaningful and acceptable interpretations of the output of the logit and probit models are based on the estimation and reporting of the marginal effects.

The marginal effects indicate how the probability that (Y = 1) changes for every unit change in an explanatory variable and they are estimated either at the means or by average effects. The marginal effects at the means estimate the marginal effects at the specified value of X, typically the mean value of X. The pitfall of the marginal effects at the means is that there may not be such a specified value of X in the sample under consideration (Torres-reyna, 2014). There is no specified value or mean in determining the financial sustainability of DTMFIs. It is either the DTMFIs are financially sustainable or they are not. The average marginal effects are therefore more preferable as they estimate the average of the individual DTMFI marginal effects. The preference for either the logit model or the probit model is purely a matter of choice because their predictive powers as reflected by the percentage of correct classification largely concur with very minor and insignificant variations (Gujarati, 2004). The probit model was chosen and used in this study for examining why the deposit-taking programs of the LISSA DTMFIs are struggling to achieve financial sustainability.

Equation 4.7 presents the specified probit model:

$$Financial\ Sustainability_{it} = \beta_0 + \Sigma\beta_j X_{it} + \Sigma\beta_k Y_{it} + \Sigma\beta_l Z_{it} + \varepsilon_{it} \qquad (4.7)$$

Financial sustainability as represented by the operational self-sufficiency was a binary outcome variable that took the value of 1 if the DTMFI was financially sustainable, and the value of 0 if the DTMFI was financially unsustainable. The regressors were subdivided into three categories. The first category of regressors which were captured as X_{it} consists of the main explanatory variable, the scale of operations measured using deposits volumes {Small Scale (*SMALL)*, Medium Scale (*MEDIUM)* and Large Scale *(LARGE)* dummies}. The second category of regressors consists of the control DTMFI-specific variables, Y_{it}. These include the number of years of operation *(AGE)*, the natural logarithm of total assets *(lnASSETS)*, the charter type dummies; Banks *(BANK)*, Credit Unions/Cooperatives *(CUC)*, Non-Bank Financial Institutions *(NBFIs)* and the Non-Governmental Organisations *(NGO)*, operating expenses to total assets *(OEA)*, loan loss provisions *(LLP)*, number of offices *(NOF)*, real yield on the gross loan portfolio *(YoGP)*, financial expenses to total assets *(FETA)* and portfolio at risk greater than 30 days *(PAR)*. The third category of regressors (Z_{it}) consists of a country-specific macroeconomic variable, regulatory quality *(REGQ)*. β_0 is the constant and β_j, β_k and β_l; are the model coefficients to be estimated. ε_{it} is the error term.

Before estimating the probit model, diagnostic tests for multicollinearity, heteroscedasticity and endogeniety were carried out to obtain sound results and to aid drawing inferences correctly. The problem of multicollinearity where the independent variables are dependent was tested using the Variance Inflation Factor (VIF) analysis and Table 4.3 shows the test results.

Table 4.3: Multicollinearity Test Results using the Variance Inflation Factor: deposits and financial sustainability

Variable	VIF	1/VIF
ASSETS	8.95	0.111714
DEP	8.43	0.118658
OEA	2.70	0.371047
YoGP	2.65	0.377800
AGE	1.49	0.678865
NOF	1.41	0.709536
REGQ	1.24	0.803222
FETA	1.17	0.852498
LLP	1.12	0.890900
PAR	1.08	0.924090
Mean VIF	3.02	

Source: Compiled by the author based on estimation results

The VIF scores of the independent variables ranged from 1.08 to 8.95 and were less than 10, the cut-off score indicating that the level of multicollinearity amongst the independent was very low. Low levels of multicollinearity were further indicated by the mean VIF value of 3.02 and the tolerance levels (1/VIF) were above 0.1, the cut-off point.

An additional test for heteroscedasticity was carried out to check if the errors had unequal or non-constant variance. For this purpose, the Breusch-Pagan test was carried out. According to this test, the null hypothesis is that the errors have constant variance (homoscedastic) and the alternative hypothesis is that the errors have non-constant variance (heteroscedastic). Failure to reject the null hypothesis (when the p-value is more than 0.05) indicates that the errors are homoscedastic. However, the results of the test indicated that the null hypothesis had to be rejected as the estimated p-value was 0.0000 which was less than the

significance level of 0.05 indicating that the errors were heteroscedastic. Since the problem of heteroscedasticity was detected, this problem was corrected by adjusting the standard errors for robustness and clustering using the vce(cluster id) command in Stata.

Another important test that is carried out in binary response models is the test for endogeniety of the explanatory variables (Arellano, 2008; Baum, Dong, Lewbel and Yang, 2012). When it is suspected that one or more of the regressors are correlated with the error term, then the problem of endogeneity exists. According to Wooldridge (2012), endogeniety in probit models is caused by omitted and time-variant variables and unobserved heterogeneity. In the present study, endogeniety of the explanatory variables was tested using the ivprobit command in Stata. The ivprobit command fits models with binary dependent variables and endogenous independent variables. Both ivprobit options which are the maximum likelihood estimator (mle) and the twostep estimator of Newey (1987) were used to test for endogeneity in the specified probit model. These two estimators assume that the endogenous explanatory variables are continuous and are not appropriate for use with discrete endogenous explanatory variables. In this study, the number of branches variable was suspected to be an endogenous variable with the logarithm of total assets and the AGE variable. This means that the number of branches that the DTMFIs have was suspected to be influenced by the size of their total assets and the number of years of operation reflecting their experience, ability to spread their wings and withstand competition in deposit mobilisation.

Using the maximum likelihood estimator option with the ivprobit command, the null hypothesis of Wald test of exogeneity was accepted as the p-value of 0.8881 was insignificant indicating that the problem of endogeniety did not exist. Additionally, the present study failed to reject the null hypothesis of the Wald test of exogeneity using the twostep estimator with the ivprobit command. The p-value of 0.8980 was insignificant indicating that endogeniety was not a problem in the specified binary response model. Since the problem of endogeneity was not found, the standard probit model was used in analysing the relationship between the scales of deposit volumes and financial sustainability.

Robustness checks to confirm the results of the baseline probit model were done by estimating the average marginal effects of the logit model. However, it is noted that adopting either of the two binary response models in the estimation process and neglecting the other is purely a matter of choice as the two models usually yield almost identical results. This was indicated earlier in this section.

The next section discusses the data, variables and methodology that were used in examining the second objective of the study on liquidity and deposit insurance.

4.4 Assessing the Relationship between Liquidity and Deposit Insurance of LISSA DTMFIs

4.4.1 Data

The second objective of the study was to assess the relationship between liquidity and deposit insurance in the depository microfinance sector of the LISSA countries. Three sources of data were used; data from the MIX for the DTMFI-specific variables based on a fixed panel dataset of 64 MIX DTMFIs sampled across 18 LISSA countries, the World Development Indicators (WDIs) of the World Bank for the country-specific variable and some secondary sources for the deposit insurance statistics. The MIX database including the reliability and validity of its data was discussed in detail in section 4.2.1, so this section focusses on the WDIs and the deposit insurance database.

The WDIs are published annual national and regional time series data on macroeconomic variables since 1960 for 217 countries worldwide. The WDIs were the source of data on the macroeconomic variable used in this study, the inflation rate, which was measured by the Consumer Price Index for 18 out of 27 LISSA countries. The 18 LISSA countries shown in Appendix 4 were included based on the completeness of the MIX reported data of the DTMFIs from their respective jurisdictions. Prior microfinance researchers that have relied on the WDIs, inter alia, include: Janda and Zetek (2014), Hessou *et al.* (2019) and Bibi *et al.* (2018). The reliability and validity of the WDIs lies in the fact that they are reported by the World Bank and are amongst the currently available and best source of data on macroeconomic variables across the globe.

Data on the state of affairs concerning deposit insurance and capital adequacy standards were extracted from three documents; the publication of the 2016 International Monetary Fund Regional Economic Outlook for SSA, the published work of Mecagni *et al.* (2015), the comprehensive deposit insurance database published in the reputable works of Demirgüç-Kunt *et al.* (2005) and Demirgüç-Kunt *et al.* (2015). These databases are currently the most reliable and valid sources of data on deposit insurance and have been relied on by empirical researchers (Ngalawa, 2012). According to Bowen (2009), document analysis involves reviewing and evaluating printed and electronic documents to deduce meaning, gaining understanding and

developing knowledge when conducting research studies. Furthermore, Bowen (2009) highlighted the importance of document analysis; providing contextual data for the research, deriving questions that may be pivotal in the research work from the documents studied, provision of supplementary data required in the research process, tracking change and development and to verify or corroborate findings from other sources. According to Cardno (2018), one advantage of document analysis is that data can be sought at little or no cost at all. Since document analysis is an organised process, some systematic steps have to be followed; skimming which involves selecting the appropriate documents for the research; a thorough examination of the selected documents through intense reading; and interpretation of the reviewed documents.

4.4.2 Variables

i. Liquidity: *Logarithm of Non-Earning Liquid Assets/Total Assets (lnNELATA)*

In line with Hessou *et al.* (2019) who used the liquid assets to total assets as a measure of liquidity in their study on loan loss provisioning and business cycles, this study uses the Non-earning Liquid Assets over Total Assets (NELATA) ratio as a measure of liquidity of LISSA DTMFIs. Liquid assets mainly represent cash on hand and demand deposits held with the regulators of the DTMFIs (Arteaga and Tejada, 2009). If these liquid assets held by the DTMFIs are non-earning, it means that they are not investable assets, therefore, they are readily available in providing liquidity in the form of withdrawals on deposits, loan requests and paying off other financial and operational commitments of the DTMFIs.

ii. Deposit Insurance: *Dummy variable (DEPINSU)*

In line with Hartarska and Nadolnyak (2007) who included a deposit insurance dummy in their study which investigated whether regulated MFIs achieve better sustainability and outreach than the unregulated ones, this study also incorporates a dummy variable which takes into account whether the countries included in the sample have deposit insurance or not. As mentioned earlier, deposit insurance schemes help to avert the danger of systemic risk or bank runs (Riquet and Poursat, 2013; Demirgüç-Kunt *et al.*, 2015; Izaguirre, 2016). Thus, deposit insurance was expected to be a positive determinant of the liquidity of the LISSA DTMFIs

iii. Capital Adequacy: *Logarithm of Equity to Total Capital (lnCAR)*

The capital adequacy ratio determines the extent to which depository and non-depository financial institutions can absorb expected and unexpected losses which, inter alia, include sudden and unexpected withdrawals on demand deposits (Riquet and Porsat, 2013; Boateng *et al.*, 2016), operational risks (Klomp, 2018) and other forms of liquidity risks (Zamore, 2018). According to Arteaga and Tejada (2009), the capital adequacy ratio links several risks faced by MFIs. Therefore, the CAR was expected to be a positive determinant of liquidity of LISSA DTMFIs. Many published microfinance studies considered the capital adequacy ratio in their estimation models (Hartarska and Nadolnyak, 2007; Hermes *et al.*, 2011; Tchakoute-Tchuigoua, 2016; Hessou *et al.*, 2019; Klomp, 2018).

iv. Basel Implementation: *Dummy Variable (BASEL)*

Following the recommendations of the Basel Accords of the Bank of International Settlements (BIS), financial institutions compare the level of their equity to the level of their total assets in the determination of their capital adequacy. The empirical model, therefore, incorporates a dummy variable that takes the value of 1 if a DTMFI operates in a country where Basel II or III implementation is in progress or has been partly or fully implemented, and 0 otherwise. A positive a priori sign is expected between Basel II or III implementation and the liquidity of depository MFIs in the LISSA countries. The study of Hessou *et al.* (2019) also captured the Basel implementation using a dummy variable.

v. Financing: *Logarithm of Deposit to Loans (lnDTL)*

The deposits to loans ratio is a financing measure that reflects the extent to which deposits mobilised by the DTMFIs finance their gross loan portfolios. As financial intermediaries, DTMFIs intermediate the deposits they take into loan portfolios (Werner, 2016) thereby providing liquidity to their clientele. Therefore, the deposits to loans ratio was expected to positively influence the liquidity of DTMFIs. Shaoyan and Duwal (2012) and Klomp (2018) used the DTL ratio in their studies.

vi. Risk: *Logarithm of Loan Loss Rate (lnLLR)*

Loan repayments may be uncertain (Mata, 2011) therefore, necessary adjustments are made to the gross loan portfolio to accommodate write-offs and recovered loans. The loan loss rate provides insight into the process of impairment of loan losses due to irrecoverable debts

(Ahlin *et al.,* 2011) and also takes into account the value of the loans recoverable. To guard against high loan loss rates which have a negative bearing on liquidity, MFIs create loan loss reserves which act as capital conservation buffers (Okafor, 2016; Hessou *et al.,* 2019). Hence, loan loss provisions were expected to be negatively related to liquidity. A recent study by Klomp (2018) also factored in the loan loss rate.

vii. Size: *Logarithm of the Gross Loan Portfolio (lnGLP*)

Size is considered as an indicator of how well the MFIs can strategically locate themselves amid competition and the rapidly changing business environment using their asset base. Thus, MFIs with large asset bases tend to enjoy various economies of scale as they operate on a bigger scale and can increase the number of active borrowers, the number of depositors, the volumes of deposits and the gross loan portfolio. Many microfinance studies have measured size using the natural logarithm of assets (Bogan, 2012; Tehulu, 2013; Xu *et al.,* 2016; Abdulai and Tewari, 2016; Chikalipah, 2017). In marked contrast, this study measures the size of the sampled DTMFIs using the natural logarithm of the gross loan portfolio following the empirical work of Quayes (2012), Bojesson and Hulten (2016) and Bayai (2017). Size was expected to be a positive determinant of liquidity.

viii. Financial Revenue: *Logarithm of Real Yield on Gross Loan Portfolio (lnYoGP)*

The yield on the gross loan portfolio represents income that accrues to the revenue base of the MFIs in the form of interest income and non-interest income after they have delivered financial services and products. The MIX adjusts the nominal yield for inflation to get the real yield. Amongst the studies that used this variable are Abdulai and Tewari (2016) and Klomp (2018). Inflows of financial revenues increase cash flow availability which helps to keep the liquidity of DTMFIs buoyant therefore financial revenue was expected to be a positive determinant of liquidity.

ix. Expenses: *Logarithm of Total Expenses to Total Assets (lnTETA)*

Due to the size of the transactions and the type and location of the clientele served by MFIs, the total costs of running an MFI tend to be very high. The main contributory costs are loan loss provisions (Hessou *et al.,* 2019), operating expenses (Abdulai and Tewari, 2017a) and financing costs (Nwachukwu *et al.,* 2018). As noted earlier, the average portfolio at risk ratio for the microfinance sector of SSA is above the international benchmark of 5 % resulting in high provisions for loan losses (Tehulu, 2013; Hessou *et al.,* 2019; MIX, 2016).

Administration costs, selling and distribution costs and prudential regulation costs, also contribute towards increases in the total expenses' ratio. Thus, the total expenses ratio was expected to be negative with the liquidity ratio.

x. Inflation: *Logarithm of the Consumer Price Index (lnCPI)*

The general increase in the price level is an obstruction in the flow of funds to DTMFIs. Inflation causes a reduction in the flow of cash to DTMFIs as the loan borrowers deliberately delay making their loan repayments because they want to do so after their loan balances have been eroded by inflation. Also, in fear of loss in the purchasing power of their deposits, depositors tend to withdraw their funds and store them in the form of hard currency or physical assets. Thus, the combined effect of these activities of borrowers and depositors negatively affect the liquidity of DTMFIs. The inflation rate as measured by the CPI has been treated as a control or country-specific variable in previous microfinance research work such as Hartarska and Nadolnyak (2007), Vanroose and D'Espallier (2013), Janda and Zetek (2014) and Otieno *et al.* (2016) Lensink *et al.* (2018) and Zamore (2018). Besides inflation, changes in exchange rates and interest contribute to the environment within which microfinance operates. However, the present study did not account for these macroeconomic variables based on the parity theories in international finance which explain the equilibrium interrelationships between the inflation rate and exchange rates (Purchasing Power Parity theory) and interest rates (Covered Interest Arbitrage theory). Therefore, this study adopted inflation as the only macroeconomic variable affecting the liquidity of the LISSA DTMFIs.

Table 4.4 below provides a summary of the variables used for assessing the relationship between liquidity and deposit insurance.

Table 4.4: Summary of the variables used to assess the relationship between Liquidity and Deposit Insurance

	Variable	Description/Measurement	Predicted Effect	Data Source
	Dependent Variable			
	Liquidity: Non Earning Liquid Assets/Total Assets *(lnNELATA)*	Logarithm of Adjusted Cash and Bank/Adjusted Total Assets		MIX
DTMFI specific	**Independent Variables**			
	Deposit Protection: Deposit Insurance *(DEPINSU)*	Dummy variable which takes the value of 1 if a country has an explicit deposit insurance scheme, and 0	+	IMF (2016a), Demriguc-Kunt *et al.* (2015) & Mecagni *et al.* (2015)
	Capital Adequacy: Capital to Assets *(lnCAR)*	Logarithm of Total Equity/Total Assets	+	MIX
	Basel Implentation: Basel *(BASEL)*	Dummy variable which takes the value of 1 if a country is implementing or has implemented Basel II/III, and 0 otherwise.	+	IMF (2016a) & Mecagni *et al.* (2015)
	Financing: Deposit to Loans *(lnDTL)*	Logarithm of Voluntary Deposits/Adjusted Gross Loan	+	MIX
	Risk: Loan Loss Rate *(lnLLR)*	Logarithm of (Adjusted Write-offs-Value of Loans Recovered)/Adjusted Average Gross Loan Portfolio	-	MIX
	Size: Logarithm of the Gross Loan Portfolio *(lnGLP)*	Logarithm of the Gross Loan Portfolio	+	MIX
	Financial Revenue: Real Yield on Gross Loan Portfolio *(lnYoGP)*	Logarithm of the Adjusted Yield on Gross Portfolio (nominal)-inflation rate/(1+inflation rate)	+	MIX
	Expenses: Total Expenses to Total Assets *(lnTETA)*	Logarithm of Financial+Credit Impairment+Operating Expenses/Total Assets	-	MIX
Country Specific	**Inflation**: Consumer Price Index *(lnCPI)*	Logarithm of the Annual percentage change in the Consumer Price Index	-	WDI

Source: Compiled by the author based on literature review

Section 4.4.3 discusses the econometric method that was used to determine the relationship between liquidity and deposit insurance.

4.4.3 Analysis Technique - Random Effects Approach

The study employed a random effects framework to analyse the relationship between liquidity and deposit insurance of the LISSA DTMFIs. According to Brooks (2008), the general panel data model is shown as:

$$Y_{it} = \alpha + \beta X_{it} + \mu_{it} \quad (4.8)$$

where: Y_{it} is the regressand factor; α is the intercept term, β is a K x 1 vector of parameters to be estimated on the regressors; X_{it} is a 1 x K vector of regressors, for i =1, … N and t = 1, … T. μ_{it} is decomposed into u_i the error term that represents the unobserved effects or individual DTMFI effects and v_{it} which represents the idiosyncratic error term.

$$\mu_{it} = u_i + v_{it} \quad (4.9)$$

The idiosyncratic error term is assumed to be identically and independently distributed with a zero mean and constant variance, $v_{it} \sim IDD(0, \sigma_v 2)$. Panel data models pool data on the individual DTMFI dimensions which are represented by subscript *i* collected over time which is represented by subscript *t*. According to Gujarati (2004) supported by Greene (2012), panel data econometrics method has the advantage of pooling both the time series and cross-sectional components of datasets than pure time series and pure cross-section data econometrics. In a similar vein, Brooks (2008, p. 488) added that with panel data econometrics, more complex problems can be addressed "than would be possible with pure time series or cross-sectional data" econometrics. Hence, Pillai (2016) added that panel data methods can exert controls on heterogeneity across individuals and over time. Amongst other benefits of panel data econometrics, (Baltagi, 2005; Hsiao, 2014) noted the following: highly informative datasets, reduction in multicollinearity, increased degrees of freedom and increased efficiency.

Specifically, the study considered two main panel data econometric methods; the fixed effects and the random effects after noticing that panel data methods facilitate accounting for the heterogeneity of the DTMFIs under study. Reputable microfinance works that used the same econometric methods, inter alia, include; (Bogan, 2012; Vanroose and D'Espallier, 2013; Bayai and Ikhide, 2016b; Abdulai and Tewari, 2017a; da Costa, 2017). Park (2011) distinguished the fixed effects approach from the random effects approach based on the treatment of dummy variables.

The fixed effects model combines the dummy variable with the intercept as shown in Equation 4.10:

$$Y_{it} = (\alpha + u_i) + X'_{it}\beta + \nu_{it} \quad (4.10)$$

The random effects model combines the dummy variable with the error component as shown in Equation 4.11:

$$Y_{it} = \alpha + X'_{it}\beta + (u_i + \nu_{it}) \quad (4.11)$$

Deciding on adopting either the FE approach or the RE approach is mainly based upon answering the question; is the unobserved effect u_i correlated with the regressors X'_{it}? While assuming that the explanatory variables X'_{it}, are not correlated with the error term u_i, the random effects method accommodates time-variant features but does not allow for the characteristic differences in the selected DTMFIs. The random effects approach uses a common mean value for the intercept for the selected DTMFIs. In marked contrast, the fixed effects method assumes that the error term u_i is correlated with the regressors X'_{it} and allows for time-invariant characteristics of the sampled DTMFIs in the estimation process. Also, the fixed effects method allows the intercept to differ across the DTMFIs and not to vary over time. The Hausman Specification Test (refer Table 4.5) was an aid in choosing between the random effects and the fixed effects models. According to this test, the null hypothesis is that the random effects model is appropriate while the alternative hypothesis is that the fixed effects model is appropriate. The random effects model is chosen when the p-value is insignificant (Gujarati, 2004).

Table 4.5: Hausman Specification Test Results

	(b) Fixed	(B) Random	(b - B) differences	sqrt(diag(V_b - V_B)) S.E.
lnCAR	-0.0214812	0.2202193	-0.2417005	0.1860379
lnDTL	-0.0431605	0.0196915	-0.062852	0.0739182
lnGLP	-0.2503368	-0.094004	-0.1563328	0.097578
lnYoGP	-0.1911913	-0.0289048	-0.1622866	0.1809482
lnLLR	0.1278093	0.0753728	0.0524364	0.0371197
lnTETA	-0.3839253	-0.1667738	-0.2171514	0.2063509
lnCPI	-0.0119737	0.0130675	-0.0250412	0.0374875

chi2(7) = (b – B)'[(V_b – V_B)^(-1)] (b – B) = 8.71

Prob > chi2 = 0.2739

Source: Compiled by the author based on estimation results

After running the Hausman test, we failed to reject the null hypothesis as the p-value of 0.2739 was more than the significance level of 0.05 indicating that the random effects model was the most appropriate model for estimating the results. Equation 4.12 shows the linear functional model for estimation:

$$lnNELATA_{it} = \beta_0 + \beta_1 D_{it}^{DEPINSU} + \beta_2 lnCAR_{it} + \beta_3 D_{it}^{BASEL} + \beta_4 lnDTL_{it} + \beta_5 lnGLP_{it} + \beta_6 lnYoGP_{it} + \beta_7 lnLLR_{it} + \beta_8 lnTETA_{it} + \beta_9 lnCPI_{it} + \mu_{it} \quad (4.12)$$

Before estimating the random effects model, some diagnostic tests were conducted[27]. The multicollinearity test results shown in Table 4.6 were based on the VIF analysis.

Table 4.6: Multicollinearity Test Results using the VIF analysis for the independent variables used for assessing Liquidity and Deposit Insurance

Variable	VIF	1/VIF
YoGP	2.60	0.384960
TETA	2.40	0.416663
BASEL	1.42	0.703610
CAR	1.35	0.740528
CPI	1.26	0.793888
DEPINSU	1.25	0.801619
DTL	1.24	0.808876
GLP	1.15	0.870722
LLR	1.10	0.912033
Mean VIF	1.53	

Source: Compiled by the author based on estimation results

As Table 4.6 shows, the VIF scores for the variables used for analysing the relationship between liquidity and deposit insurance ranged from 1.10 to 2.60 indicating that multicollinearity levels were very low. The mean VIF for all the explanatory variables was also very low at 1.53 and the tolerance levels ranged between 0.3684960 to 0.912033 and were within the acceptable level.

To test for heteroscedasticity, the Breusch-Pagan test was used again and the p-value obtained was 0.0000 indicating that the null hypothesis was rejected as the errors exhibited heteroscedasticity. To correct this problem, all the variables used in the estimation model were

[27] This section also utilised the same diagnostic tests that were used in Section 4.2.3 for multicollinearity and heteroscedasticity, except for the White's robust standard errors, another technique for solving the problem of heteroscedasticity. Endogeniety in this section was tested using a different technique as explained below.

transformed into logarithm format except for the dummies (DEPINSU and BASEL). Furthermore, the estimated model was corrected for White's robust standard errors.

Since the random effects model was adopted as the baseline model, this means that the unobserved individual effects captured in the error term are not correlated with any of the explanatory variables suggesting that there is no problem of endogeniety. Thus, this exogeneity assumption must hold if the random effects model is a consistent and efficient estimator. According to Qian (2014), the random effects model can be consistently estimated using the Ordinary Least Squares (OLS) or Generalised Least Squares (GLS) methods. The GLS method is more efficient than the OLS method. However, in the presence of endogeneity, these methods are biased and inconsistent due to their assumption that the explanatory variables are exogenous. Therefore, to ensure that endogeniety was not a problem in the estimation process, the study employed the Two-Stage Least Squares (2SLS) technique as a testing technique using the ivregress command in Stata.

The results of the ivregress command also enabled the study to identify the correct model (2SLS or the OLS method) for checking the robustness of the random effects model results. In the presence of endogeniety, the 2SLS method is preferred to the OLS method and in the absence of the endogeneity, the OLS method is superior to the 2SLS method. The present study treated size *(lnGLP)* as an endogenous variable as this variable was suspected to be influenced by financing revenue *(lnYoGP)* and risk proxied by the loan loss rate *(lnLLR)*. The later variables were treated as instrumental variables. The results of the 2SLS method shown in Table 4.7 indicated that endogeniety was not a problem suggesting that the OLS method was more appropriate than the 2SLS method.

Table 4.7: Endogeniety Tests using the 2SLS method

Test of endogeniety (estat endog command)	H_0: Variables are exogenous H_1: Variables are endogenous *p-values* Durbin test: 0.8216 Wu-Hausman test: 0.8265	The insignificant p-values of the Durbin and Wu-Hausman tests support that the null hypothesis could not be rejected. This led to the conclusion that the suspicion that size *(lnGLP)* is an endogenous variable influenced by financial revenue *(lnYoGP)* and risk *(lnLLR)* was not supported.
Instruments' strength (estat firststage command)	H_0: Instruments are weak H_1: Instruments are strong *p-value:* 0.0045 Minimum eigenvalue statistic: 5.58086	Though the minimum eigenvalue statistic value was low indicating that the instruments were weak, their p-value was significant hence the instrumental variables were appropriate for testing the endogenous variable.
Over-identifying restrictions (estat overid command)	H_0: Instruments are valid and the model is correctly specified. H_1: Instruments are not valid and the model is not correctly specified. *p-values:* Sargan test: 0.8326 Basmann test: 0.8370	The insignificant values of the Sargan and Basmann tests supported the null hypothesis that instruments set for testing for endogeneity was valid and that the model was correctly specified.

Source: Compiled by the author based on estimation results

As stated above, the GLS method is more efficient than the OLS estimator in checking the consistency of the baseline random effects model (Greene, 2012), therefore the study

adopted the GLS method for robustness purposes. Using the xtgls command in Stata, the GLS method allows estimation in the presence of AR(1) autocorrelation within panels, correlation amongst the cross sections and heteroscedasticity across the panels. The robustness check results of the GLS method are presented in Table 5.8 under section 5.3.3 and the estimated regression output showed that the panels were homoscedastic and there was no autocorrelation. Since the present study utilised an unbalanced panel dataset, cross sectional correlation across the panels was not tested because the panels must be balanced for this test to be carried out.

In the next section, the data, variables and the statistical method that were used for answering the third objective of the study are discussed.

4.5 Investigating the Outreach and Financial Sustainability Nexus in depository microfinance

4.5.1 Data

The third objective of the study was to examine whether there is any evidence of mission drift and trade-off in the LISSA's depository microfinance sector in the pursuit of outreach and financial sustainability goals. The fixed panel data of the 64 MIX reporting LISSA DTMFIs was utilised. The WDIs discussed in Section 4.3.1 were the source for data on the country-specific variables. Moreover, an additional sample of 36 DTMFIs sampled across 6 Non-LISSA countries (Cameroon, Ghana, Ivory Coast, Kenya, Nigeria and South Africa) was included for comparing and contrasting the baseline results. The reliability and validity of the MIX database and the WDIs of the World Bank were discussed in sections 4.3.1 and 4.3.2, respectively. Appendix 5 provides additional details of the Non-LISSA DTMFIs which were considered for robustness check purposes in examining outreach and financial sustainability in the depository microfinance sector. The next section discusses the variables used in the econometric estimation process.

4.5.2 Variables

i. **Outreach Depth:** *Average Deposit Balance per Depositor/Gross National Income per Capita (AVDGNI)*

The average deposit balance per depositor is a depth of outreach measure that is reflective of the size of the savings that the microdepositors contribute to the deposit base of the DTMFIs for a particular period. Rosenberg (2009) stated that deposits that are used for the computation

of this metric are those that have not been withdrawn by depositors. According to Tulchin *et al.* (2009), average balances on deposits are indicative of how responsive the DTMFIs are to the needs of their clients. Thus, the low-income level clients and the pro-poor poor who cannot benefit from the financial intermediation of commercial banks are given a chance to open savings accounts that are appropriate for them by the DTMFIs. The pro-poor clients, therefore, prefer to lodge small average balances of their savings with the depository institutions while the better-off clients prefer to lodge large average balances of their savings. Thus, the average balances on deposits correspond to the income level of the depositors (Churchill and Marr, 2017). Robinson (2004) argued that larger average balances on deposits enable the DTMFIs to run their businesses profitably serving both the very poor and the non-poor. A study by Mata (2011) associated larger average deposit balances with DTMFIs that deal with diaspora remittances. Dokulilova *et al.* (2009) justified larger average balances by stating that such balances are ideal in certain situations, for instance, saving for a bigger event such as a wedding ceremony. Tulchin *et al.* (2009) recorded that the average deposit balance per depositor cannot be the same across different countries, therefore, to accommodate cross country variations, the average deposit balance per depositor is divided by the Gross National Income (GNI) per capita. In complementing this view, Rosenberg (2009) wrote that average balances that are below 20 % of their GNI are pointers that consumers of microfinance products are very poor. This indicates that DTMFIs that target low income depositors follow the Welfarists approach as they serve the pro-poor, the original mission of microfinance provision. Deviation of focus from small income depositors to large income depositors indicates mission drift.

ii. Outreach Breadth: *Logarithm of the Number of Voluntary Depositors (lnNODEP)*

Rozas and Erice (2014) argued that the outreach of MFIs that mobilise deposits from the poor and the low-income households can only be analysed accurately if the number of depositors and their average account balances are considered. In the same vein, the Basel Committee on Banking Supervision (BCBS) (2010) noticed that though the sizes of the deposits account balances are very small, these institutions serve very significant numbers of depositors in some parts of the world. Therefore, the rush to increase the market share drives the DTMFIs to cast their nets wide so that they reach as many depositors as possible.

As the number of the depositors increases, the breadth of outreach increases in quantity. This, in turn increases the volume of deposits resulting in positive returns in economies of scale which boost profitability. This argument is supported by the Institutionalists' theorists. Thus,

the increase in the number of depositors in the depository microfinance sector in SSA speaks to the commendable growth in the volume of the deposits that they mobilise. At the same time, a decrease in the number of depositors may also lead to an increase in the volume of deposits. This happens when few depositors lodge very large deposits with the DTMFIs and this is also prevalent when the few depositors have multiple accounts within the same DTMFIs.

iii. Financial Sustainability: *Operational Self-Sufficiency (OSS)*

Operational self-sufficiency is the commonly used measure of financial sustainability in empirical studies (Hartarska and Nadolynak, 2007; Zerai and Rani, 2011; Martínez, 2015; Bayai and Ikhide, 2016b; Abdulai and Tewari, 2017a). As noted above, the relationship between outreach and financial sustainability depends on the variables used to measure outreach (Yeshi, 2015) and on the goals of focus established by the institutions that provide microfinance services and products (Churchill and Marr, 2017). After a careful examination of empirical studies, it was postulated in this study that: following the Welfarists' approach yields a negative relationship between outreach depth and financial sustainability; and following the Institutionalists' approach yields a positive relationship between outreach breadth and financial sustainability.

iv. Gender: *Percentage of Women Clientele (POW)*

The pioneer microfinance programs such as the Grameen model mainly focused on lending to women for some reasons. The percentage of women borrowers, therefore, was a proxy that reflects the relative proportion of the total number of women to the total number of clients served by the DTMFIs. As discussed in Section 2.2.2, a high percentage of the proportion of women clientele reflects that the DTMFIs are deepening their outreach (Marr and Awaworyi, 2012). A declining focus towards lending to women is a sign that the DTMFIs are inclining their programs to those of the commercial banks who mainly focus on men who work or are entrepreneurial and have savings accounts (Briere and Szafarz, 2014). The percentage of women clientele variable was expected to be positive in the depth of outreach model and positive in the breadth of outreach model. Prior studies also considered the percentage of women clientele in their estimation models (Hermes *et al.*, 2011; Kipesha and Zhang, 2013; Janda and Zetek, 2014; Nyanzu and Perprah, 2016; Abdulai and Tewari, 2016).

v. Financing and Financial Intermediation: *Deposits to Total Assets (DTA)*

The deposits to assets ratio indicate the extent to which the deposits finance the total assets portfolio of the DTMFIs. According to the MIX, the deposits to assets ratio is not only a measure of deposit financing but is also a measure of the level of financial intermediation by the DTMFIs (MIX, 2009). A deposit to assets ratio greater than 20 % indicates high levels of financial intermediation, a deposit to assets ratio less than 20 % reflects low levels of financial intermediation and a deposits to assets ratio of 0 % indicates that there is no financial intermediation. Following the empirical findings of Bayai and Ikhide (2016b) on financing structure and outreach of SADC MFIs, the deposits to assets variable was expected to be positive with both the depth and breadth of outreach.

vi. Productivity: *Depositors per Staff Member (DEPSTAME)*

The depositors per staff member ratio compares the total number of depositors to the total number of personnel working in the DTMFIs. According to the MIX, the depositors per staff member is an indicator of how many depositors can an employee handle at a particular period. In other words, the depositors per staff member is a productivity ratio. Given that the numbers of depositors exceed the number of active borrowers for the DTMFIs in Sub-Saharan Africa, the impression is that the personnel in these depository establishments are highly productive. A positive a priori sign was therefore assigned for both outreach depth and breadth measures.

vii. Experience: *Number of Years of Operation (AGE)*

Age relates to the number of years the DTMFIs have been operational since their establishment. Over time, a couple of microfinance studies have considered the age variable in their econometric estimation (Johnson, 2015; Xu *et al.*, 2016; Bayai and Ikhide, 2016b; Churchill and Marr, 2017). Vanroose and D'Espailler (2013) observed that as MFIs age, their success rate varies, some being viable and increasing outreach, and others are ailing and folding up thereby decreasing outreach. A net positive impact of age was therefore expected on both models.

viii. Size: *Logarithm of Total Assets (lnASSETS)*

Size in the microfinance sector is traditionally measured using the natural logarithm of the total assets held by the MFIs (Ahlin *et al.*, 2011; Bogan, 2012; Marr and Awaworoyi, 2012; Johnson, 2015; El-Maksoud, 2016; Bayai, 2017; Tadele *et al.*, 2018). The size proxy represents

the ability of the MFIs to strategically position themselves in fighting competition, adapting to technological revolutions, and seizing diversification and investment opportunities (Wijesiri *et al*., 2015). Therefore, this study assigned a positive a priori sign between the natural logarithm of total assets variable and the depth and breadth of outreach measures.

ix. Risk: *Portfolio Risk > 30 days (PAR)*

Default risk is inevitable in the operation of a microfinance business given that some of the microloan beneficiaries have seasonal, irregular and very low flows of income thereby affecting their ability to repay the borrowed funds. Portfolio at Risk (PAR>30 days) represents the proportion of the total gross loan portfolio that is overdue for repayment by 30 days and also the portion of the gross loan portfolio that has been renegotiated. Chances are high that overdue payments and renegotiated loans will not be repaid resulting in the deterioration of the loan portfolio quality thereby stifling the depth and breadth of the outreach of the DTMFIs. A negative a priori sign was therefore assigned accordingly. The PAR>30 days variable was included amongst the explanatory variables in this study following the empirical work of other researchers (Bayai and Ikhide, 2016b; Abdulai and Tewari, 2017a; Caro, 2017; Tadele *et al.,* 2018).

x. Competition: *Commercial Bank Branches (ComBB)*

The existence of commercial banks in the financial development landscape as measured by the number of commercial bank branches per 100 000 adults poses competition upon the MFIs. A negative sign was assigned for the interaction of the commercial bank branches with both the depth and breadth of outreach. Prior studies that incorporated the commercial bank branches per 100 000 adults include Al-Azzam *et al.* (2012), Cull *et al.* (2013) and El-Maksoud (2016).

xi. Location: *Percentage of Rural Population (RPOP)*

The 2017 WDIs show that more than 50 % of the population in Low-Income Sub-Saharan Africa resides in rural areas. Janda and Zetek (2014) noted that vastly populated rural areas indicate that there is a high demand for microfinance products; therefore, MFIs are envisaged to cater for their financial needs. This study expected a positive relationship between the percentage of the rural population and the depth and breadth of outreach.

xii. Regional Factors: *Sub-regions (CA, WA, EA and SA)*

Sub-regional differences across Sub-Saharan Africa have an impact on the different characteristics and performance of microfinance providers (Mokaddem, 2009; Sainz-Fernandez *et al.,* 2015; Wijesiri *et al.,* 2015; Tadele *et al.,* 2018). In this study, location was a dummy variable which constituted four sub-regions; Central Africa (CA), Western Africa (WA), Eastern Africa (EA) and Southern Africa (SA). These four sub-divisions of Sub-Saharan Africa are based on the 2018 statistics of the UNCTADs' classification of countries by sub-regions. This classification eliminated the LISSA DTMFIs from Southern Africa as this region has no LICs. The a priori expectations varied across the sub-regions. The default sub-regional dummies were Eastern Africa for the LISSA DTMFIs and Southern Africa for the Non-LISSA DTMFIs. As noted in section 2.2, Eastern Africa is an outlier sub-region in the development of microfinance in the African continent so the present study had to treat this sub-region as a default category so that the baseline findings of the study are not affected. Nonetheless, in the robustness check results for the Non-LISSA DTMFIs, Southern Africa was the default category as there was only one DTMFI in the sample to represent this sub-region (refer to Appendix 5). Table 4.8 provides a summary of the variables used.

Table 4.8: Summary of the variables used to analyse the relationship between Outreach and Financial Sustainability

	Variable	Description/Measurement	Predicted Effect	Data Source
	Dependent Variable (s)			
	Model 1: Depth of Outreach: Average Deposit Balance per Depositor/Gross National Income per Capita *(AVDGNI)*	Average deposit balance per depositor compared to local GNI per capita		MIX
	Model 2: Breadth of Outreach: Number of Depositors	Natural logarithm of the number of individuals who currently have funds on deposit with the financial institution.		MIX
DTMFI specifics	**Independent Variables**			
	Financial Sustainability: Operational Self-Sufficiency *(OSS)*	Financial Revenue/Financial Expenses + Impairment Losses on Loans + Operating Expenses	positive with *AVDGNI* & negative with *lnNODEP*	MIX
	Gender: Percentage of Women Clientele *(POW)*	Number of female borrowers as a percentage of total borrowers at period	+	MIX
	Financing & Financial Intermediation: Deposits to Total Assets *(DTA)*	Voluntary Deposits/Adjusted Total Assets	+	MIX
	Productivity: Deposit per Staff Member *(DEPSTAME)*	Total number of depositors divided by total personnel.	+	MIX
	Experience: Age (Dummy Variable) *(AGE)*	Number of years of operation	+	MIX
	Size: Logarithm of the Total Assets *(lnASSETS)*	Total Assets adjusted for inflation and subsidized provisioning for loan impairment and write-offs	+	MIX
	Risk: Portfolio at Risk *(PAR)*	The portion of loans greater than 30 days past due, including the value of all renegotiated loans compared to gross loan portfolio.	-	MIX
Country specific	**Competition**: Commercial Bank Branches *(ComBB)*	Commercial bank branches per 100 000 adults	-	WDI
	Location: Percentage of Rural Population *(RPOP)*	The difference between total population and urban population.	-	WDI
Region specific	**Sub-regions:** Central Africa (CA), Western Africa (WA), Eastern Africa (EA) and Southern Africa (SA)	Dummy variables categorizing DTMFIs and their countries of origin into four LISSA sub-regions	varies	MIX & United Nations

Source: Compiled by the author based on literature review

Section 4.5.3 which is next, outlines the econometric method that was used for investigating the outreach and financial sustainability nexus in the LISSA's depository microfinance sector.

4.5.3 Analysis Technique - System Generalised Method of Moments (SGMM)

Panel data models are preferred for pooling together the cross-sectional components and the time series components of datasets and also for reducing collinearity amongst the regressors (Brooks, 2008). Despite these advantages, general panel data estimation models exhibit endogeneity, a problem which has ignited a growing focus on dynamic panel data estimation models in microfinance studies (Mersland and Strøm, 2010; Kar and Swain, 2014; El-Maksoud, 2016; Tchakoute-Tchuigona, 2016; Amin *et al.*, 2017; Churchill and Marr, 2017; Chikalipah, 2017, 2018; Hessou *et al.*, 2019; Lensink *et al.*, 2018) and across different research disciplines (Nzimande and Ngalawa, 2017; Vengesai and Kwenda, 2018).

In dynamic panel data analysis, the endogeneity problem is caused by measurement errors, omitted variables and reverse causality. The pooled OLS method is an inefficient estimator in addressing the endogeneity problem because the individual heterogeneity though not directly observable, correlates with the regressors. This method is used when the individual heterogeneity is assumed to be non-unobservable. According to Nickell (1981), the within group estimator removes the individual fixed-term effects but falls short in addressing the endogeneity problem as it produces inconsistent estimates. The first differencing technique which eliminates the individual fixed-term effects still does not address the endogeneity problem due to inconsistency. Another alternative, the Instrumental Variable (IV) technique by Anderson and Hsiao (1981), does not make use of all the moment conditions and has problems that are associated with identifying the instruments. As such, the Generalised Method of Moments (GMM) which was first developed by Arellano and Bond (1991) and later on refined in the works of Arellano and Bover (1995) and Blundell and Bond (1998) evade the endogeneity problem.

Dynamic panel data models incorporate a lagged dependent variable as one of the explanatory variables. This introduces dynamic bias or the endogeneity problem as the lagged dependent variable correlates with the time invariant fixed effect error term which allows for individual heterogeneity. Mairesse and Hall (1996) noted that incorporating all the valid instruments of the lagged endogenous variable makes the GMM superior to estimators such as the pooled OLS, first differencing, the within group estimator and the instrumental variables

technique in addressing the endogeneity problem. Additionally, the dynamic panel data models can deal with the Nickel bias in fixed effects and have been applied as a valuable estimation technique in dynamic partial adjustment microfinance studies (Hessou *et al.*, 2019). This study, therefore, employed dynamic panel data modelling in linking the depth and breadth of outreach deposit-taking measures of the LISSA DTMFIs to the financial sustainability measure. A dynamic panel data model is appropriate for this study as the dataset used has a small *T* (12 years) and a large *N* (64 DTMFIs) (Baum, 2013; Bun and Safaradis, 2013). The general form of a dynamic panel data model is shown in Equations 4.13 and 4.14 as follows:

$$Y_{it} = \gamma Y_{it-1} + X_{it}\beta + \epsilon_{it}; |\gamma| < 1 \quad (4.13)$$

$$\epsilon_{it} = \mu_i + \varepsilon_{it} \quad (4.14)$$

where; Y_{it} is the regressand factor, Y_{it-1} is the lagged regressand, $|\gamma| < 1$ is the intercept and is less than one; X'_{it} is a 1 x *k* vector of regressors; β is *k* x 1 vector of parameters to be estimated on the regressors for *i* = 1, … *N* and t = 1, … *T*. μ_i denotes the time invariant individual heterogeneity and ε_{it} denotes the idiosyncratic error component. μ_i and ε_{it} are assumed to be independent and identically distributed *(IDD)* with a zero mean and constant variance (0, σ^2) and are exogenous to each other hence,

$$\in (\mu_{it}) = (\varepsilon_{it}) = (\mu_{it}, \varepsilon_{it}) = 0 \quad (4.15)$$

According to Rozas and Erice (2014), the outreach of MFIs that mobilise deposits can only be analysed accurately if the number of depositors and their average account balances are considered. Therefore, the study adopted two dependent variables in the estimation process.

$$AVDGNI_{it} = \beta_0 + \beta_1 AVDGNI_{it-1} + \beta_2 OSS_{it} + \beta_3 DTA_{it} + \beta_4 DEPSTAME_{it} + \beta_5 AGE_{it} + \beta_6 POW_{it} + \beta_7 lnASSETS_{it} + \beta_8 PAR_{it} + \beta_9 ComBB_{it} + \beta_{10} RPOP_{it} + \beta_{11} D_{it}^{SUBREGION} + \mu_i + \partial_t + \varepsilon_{it} \quad (4.16)$$

$$lnNODEP_{it} = \beta_0 + \beta_1 lnNODEP_{it-1} + \beta_2 OSS_{it} + \beta_3 DTA_{it} + \beta_4 DEPSTAME_{it} + \beta_5 AGE_{it} + \beta_6 POW_{it} + \beta_7 lnASSETS_{it} + \beta_8 PAR_{it} + \beta_9 ComBB_{it} + \beta_{10} RPOP_{it} + \beta_{11} D_{it}^{SUBREGION} + \mu_i + \partial_t + \varepsilon_{it} \quad (4.17)$$

Equation 4.16 above is the empirical model for outreach depth following the Welfarists' approach where the dependent variable is the average deposit balance per depositor/GNI per capita, $AVDGNI_{it}$. Equation 4.17 above specifies the empirical model for the outreach breadth

following the Institutionalists approach where the dependent variable the natural logarithm of the number of depositors, $lnNODEP_{it}$. $AVDGNI_{it-1}$ is the one period lagged dependent variable for outreach depth. $lnNODEP_{it-1}$ is the one period lagged dependent variable for outreach breadth. β represents the estimation parameters. The lagged dependent variables were considered as endogenous variables. Financial sustainability captured as OSS_{it} is the main explanatory variable and was treated as a weakly exogenous variable. The three categories of controls were assumed to be strictly exogenous variables; DTMFI specific (DTA_{it}, $DEPSTAME_{it}$, AGE_{it}, POW_{it}, $lnASSETS_{it}$, PAR_{it}), macroeconomic ($ComBB_{it}$, $RPOP_{it}$) and the sub-regional dummies (*CA, WA, EA and SA*). The error component was broken down into the unobservable individual DTMFI heterogeneity effects, μ_i; the time varying effects, ∂_t; and the idiosyncratic term, ε_{it}.

Equations 4.16 and 4.17 above incorporated the outreach measures AVDGNI and lnNODEP as lagged independent variables. It was assumed that the dataset contains an autoregressive process, therefore, lagging the dependent variable(s) amongst the independent variables accommodates how the past outreach performance influences the current outreach performance. The endogeneity problem was addressed by assuming that the unobservable individual heterogeneity or fixed effects of the sampled DTMFIs are correlated with the DTMFI specific variables. Specifically, the SGMM estimator was employed as it makes use of additional instruments of the lagged dependent variables thereby improving efficiency and averting the problems of weak instruments associated with the Difference Generalised Method of Moments (DGMM) estimator (Blundell and Bond, 1998). According to Blundell *et al.* (2011), the SGMM imposes mild restrictions on the initial condition process and it has more asymptotic efficiency than the non-linear GMM in finite sample properties. Thus, the SGMM utilises the one period lagged regress and as instruments in levels in Equation 4.13 (which is the first SGMM equation), thereby ensuring no correlation between the endogenous DTMFI specifics and the error term. The first differenced equation which is the second SGMM equation, which provides additional instruments to increase efficiency of the model. The instruments proliferation problem is addressed through the collapse option. Moreover, since the study utilised unbalanced panel data, the SGMM is appropriate because it can handle unbalanced data through orthogonal deviations thereby minimising loss of observations.

To ensure consistency of the SGMM estimation technique, the estimated econometric model must pass two tests which were utilised in this study (Roodman, 2009). Firstly, the

instruments must be valid and this is tested using the Sargan-Hansen test for identifying over restrictions or instruments' proliferation. According to the null hypothesis of this test, the instruments must be uncorrelated with the error term, that is, the instruments must be valid. Therefore, when tabulating the SGMM results, the number of instruments reported must be lower than the number of cross-sectional units and the p values of the test must be insignificant. In this study, the estimated models passed this test except for the outreach depth model in the robustness checks (refer to the lower panel of Table 5.10).

The second diagnostic test utilised was the Arellano-Bond (AR) test for checking autocorrelation of the residuals. The null hypothesis is that there is no second order serial correlation (AR(2)) in the residuals but first order serial correlation (AR(1)) is likely to occur due to the presence of a lagged dependent variable. This means that the estimated SGMM model is correctly specified if the AR(2) test is insignificant. In this study, the robustness of the SGMM models estimated was evidenced by failure to reject the null hypotheses in both the Sargan-Hansen and Arellano-Bond (AR) tests (refer to the lower panel of Table 5.10).

Additional diagnostic tests for multicollinearity and heteroscedasticity were also carried out. To test for multicollinearity, the Variance Inflation Factor Analysis (VIF) was employed and the results are shown in Table 4.9.

Table 4.9: Multicollinearity Test Results using the VIF analysis for the independent variables used for assessing Outreach and Financial Sustainability

Variable	VIF	1/VIF
DTA	1.71	0.584916
DEPSTAME	1.60	0.626211
ASSETS	1.51	0.663464
RPOP	1.41	0.710460
POW	1.39	0.721109
AGE	1.34	0.745397
ComBB	1.32	0.759970
OSS	1.14	0.874304
PAR	1.08	0.922376
Mean VIF	1.39	

Source: Compiled by the author based on estimation results

The test scores ranged between 1.08 and 1.71 indicating very low levels of multicollinearity.

The null hypothesis test of the Breusch-Pagan test that the errors are homoscedastic was rejected indicating that the data utilised suffered from heteroscedasticity. The robust option of the dynamic data model estimated corrected this problem (Roodman, 2009).

For robustness purposes, the study changed the sample and considered the Non-LISSA DTMFIs but maintained the same econometric methodology used for obtaining the baseline results which is the SGMM method. It is common practice in most empirical studies to conduct robustness checks for the baseline results by using different estimation techniques (Bogan, 2012; Mersland and Strøm, 2010), but there has been a diversion by a few empirics who considered the use of different variables or samples while maintaining the same estimation techniques used for obtaining the baseline results (Kipesha and Zhang, 2013; Abduali and Tewari, 2017). In this study, the former approach of varying the analysis technique was not followed but the latter approach of varying the sample (36 DTMFIs sampled across 6 Non-LISSA countries; Cameroon, Ghana, Ivory Coast, Kenya, Nigeria and South Africa) was adopted due to the following reasons.

Firstly, since the SGMM method is superior to all other panel econometric methods in solving the problem of endogeniety and in capturing the dynamic nature of the data of the Non-LISSA DTMFIs, it was plausible to maintain the SGMM approach in the robustness checks. Secondly, according to the 2017 World Development Indicators of the World Bank, the Non-LISSA DTMFIs operate in economies which have higher levels of the national income of US$1 026 and above as measured by the GNI per capita, than those in the LISSA countries whose national income levels are US$1 025 or less. This entails that residents of the Non-LISSA countries have higher levels of disposable income indicating that they have larger savings (in absolute terms) that they lodge with DTMFIs thereby increasing the size of the average deposit balance per depositor/GNI per capita. Additionally, the high levels of disposable incomes also indicate that the number of people that lodge deposits in the Non-LISSA countries are more than those in the LISSA countries as their chances of savings surplus cash resources are high. Accordingly, this has implications for mission drift and trade-offs in the pursuit of the social mission (depth and breadth of outreach) and financial mission (financial sustainability) of the Non-LISSA DTMFIs, concurrently. Therefore, the sample of the Non-LISSA DTMFIs was chosen to compare and contrast the results of the LISSA DTMFIs so that any similarities and differences may be identified thereby enhancing the inferences and generalisations across the whole region of Sub-Saharan Africa.

4.6 Ethical Considerations

In line with the university requirements of carrying out research studies, ethical considerations were taken into account. Before conducting the study, ethical clearance was first sought and obtained from the university. However, the study did not involve interactions with human beings because secondary data were utilised.

4.7 Conclusion

This chapter outlined the research methodology that was adopted in answering the study's research questions and objectives. A detailed description of the nature and types of data used and their sources were also given, together with the details of the sample and the sampling procedure. Furthermore, the chapter provided an in-depth discussion of the econometric techniques that were used in the estimation process and the variables that were incorporated in the specified empirical models. Chapter five, which is next, presents and discusses the research findings of the three objectives of the study.

CHAPTER FIVE:
RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents and discusses the results of the research findings in three sections in line with the three objectives of the study. In each section, the results are presented and discussed through descriptive statistics, correlation analysis and empirical analysis. Section 5.2 presents and discusses the results for the first objective of the study that investigated why the depository microfinance sector of the LISSA countries falls short in attaining financial sustainability despite having huge deposit volumes. Section 5.3 presents and discusses the results for the second objective of the study that analysed the relationship between liquidity and deposit insurance in the LISSA's depository microfinance sector. Section 5.4 presents and discusses the results for the third objective of the study which examined whether the outreach-financial sustainability nexus in the LISSA's depository microfinance sector exhibits a trade-off or mission drift. Section 5.5 concludes the chapter through a summary.

5.2 Results for Deposits and Financial Sustainability

This section discusses the results of the first objective of the study in three categories; descriptive statistics, pairwise correlations and probit regression.

5.2.1 Descriptive Statistics

5.2.1.1 Descriptive Statistics for the variables used

Table 5.1 below shows the descriptive statistics of the variables used for examining the relationship between scales of deposit volumes and financial sustainability. The mean value for operational self-sufficiency of 99.97 % is close to 100 % giving the impression that on average, the LISSA's depository microfinance sector is financially sustainable. However, empirical studies show that this is not the case for all the LISSA DTMFIs when they are looked at as individual firms (Riquet and Poursat, 2013; Abdulai and Tewari, 2017a; Bayai and Ikhide, 2018). On average, the LISSA DTMFIs are 16.7 years old, with the average youngest LISSA DTMFI being 7 years old and the most mature LISSA DTMFI is 41 years old.

Table 5.1: Descriptive statistics for the variables used (Deposits and Financial Sustainability)

Variable	Mean	Standard Deviation	Min	Max
Operational Self Sufficiency (OSS)	99.968	32.626	0.38	228.12
Deposits (DEP)	12613879.89	26658591.65	12386	161328275
Age (AGE)	16.90018	6.603735	7	41
Assets (ASSETS)	20949463	35129888	157185	214144887
Operating expenses to total assets (OEA)	23.78416	17.26236	2.85	164.14
Loan loss provisions (LLP)	1.604674	2.16688	-8.33	13.32
Number of offices (NOF)	24.17174	33.00483	1	164
Yield on the gross loan portfolio (YoGP)	26.79577	16.24464	-16.06	80.13
Financial expenses to total assets (FETA)	2.875534	3.607388	-33.46	35.13
Portfolio at risk (PAR)	6.865012	7.964409	-14.57	97
Regulatory quality (REGQ)	-0.6211033	3776209	-1.59	.67

Source: Compiled by the author using data from the Microfinance Information Exchange

Overall, the statistics for the AGE variable suggest that the LISSA DTMFIs are experienced deposit-taking financial service providers. However, the LISSA DTMFIs experience challenges in controlling their overhead costs as indicated by the high average operating expenses ratio of 24 % which on average, erodes almost 89 %[28] of the real yield generated on the gross loan portfolio. The average yield on the gross loan portfolio during the period under study for the sample was 27 %. In the worst-case scenario, an average DTMFI recorded 164 % as the maximum value of the operating expenses to assets ratio. Despite the very low mean value of the loan impairments (1.60 %), the average portfolio at risk value of

[28] 89 % was derived by comparing the average operating expenses ratio to the average yield on the gross loan portfolio. Analysing the operating expenses ratio enables a quick comparison between the yield on the gross loan portfolio with the staff and administrative costs, that is, how much the loan earns versus how much was spent to generate and monitor the loan (Rosenberg, 2009).

6.86 % is greater than the international benchmark of 5 % implying that financial sustainability is negatively affected by decreasing the loan portfolio quality (MIX, 2019). The regulatory quality variable mean value of -0.62 implies that on average, the quality of the regulatory processes in the region under consideration is of a low standard.

As deposits are the main source of funding in the depository microfinance sector in the LISSA countries (MIX, 2019), the financial expenses ratio has a very low average of 2.88 %. This suggests that the low financial expenses improve financial sustainability. In terms of geographical coverage, average LISSA DTMFIs have approximately 24 offices per country indicating wide coverage. At minimum, some DTMFIs only have one office implying very low coverage while on the other extreme, some DTMFIs have a maximum of 164 offices indicating extensive distribution. Though an extensive coverage is good in terms outreach breadth, it comes along with capital and revenue expenditures that retard the chance of the LISSA DTMFIs in reaching the financial sustainability threshold with ease. In terms of size, an average DTMFI has total assets of US$20 949 463 suggesting that an average DTMFI is a medium-sized firm.

5.2.2 Correlation Analysis

Table 5.2 shows the correlation analysis output for the variables used in examining the link between scales of deposit operations and the financial sustainability of LISSA DTMFIs. Small-scale deposit operations are negatively related to financial sustainability suggesting that transaction costs of these types of deposits dwindle the operating income (de Sousa-Shields and King, 2005). The medium-scale deposits and large-scale deposits have a positive association with financial sustainability suggesting that there are efficiency gains of dealing with these types of deposit scales (Ngo *et al.*, 2014). The operating expenses ratio is negative with large-scale deposits indicating that failure to control rising operational costs as the scale of operations increases, erodes the benefits that are associated with increasing returns to scale (Rai and Rai, 2012). The result is that the chance of attaining financial sustainability is reduced. While ageing shows a positive relationship with self-sufficiency, operating with either small-scale or medium-scale deposits is negatively associated with the ageing of the DTMFIs. Nonetheless, operating on a large-scale is positive with ageing.

The asset variable is significant with financial sustainability, and with the BANK and CUC charter types suggesting that investment in real and other assets by these DTMFI

modalities helps their deposit mobilisation programs to be profitable. The loan loss provisions, portfolio at risk and regulatory quality are all negative with operational self-sufficiency indicating that failure to put a reasonable check on these variables erodes the profits that contribute towards attaining financial sustainability (refer to the descriptive statistics discussed above). Interest costs (FETA) is negative with financial sustainability and for CUCs and NGOs. This is unexpected since the financial structure of the DTMFIs is mainly characterised by cheap deposit financing (Lützenkirchen and Weistroffer, 2012). Another unexpected relationship is that of the interest income (YoGP) with self-sufficiency, the CUCs and NBFIs, which is negative. Interest income is expected to improve financial sustainability (Nwachunkwu *et al.*, 2018). The BANKs and the NGOs were positive and significant with interest income. The BANKs and NBFIs which are mainly profit-oriented institutions have a negative relationship with financial sustainability while the CUCs and NGOs which are less profit-oriented institutions have a positive relationship with financial sustainability. The correlations between financial sustainability and the profit-oriented institutions were unexpected as these financial institutions take a leading role in the search for financial sustainability than the non-profit oriented institutions (Lützenkirchen and Weistroffer, 2012). Overall, the correlation matrix shows that the relationships between the variables are weak indicating that there are low levels of multicollinearity.

Table 5.2: Correlation Analysis Output for the variables used for analysing Deposits and Financial Sustainability

	OSS	SMALL	MEDIUM	LARGE	BANK	CUC	NBFI	NGO	AGE	ASSETS	OEA	LLP	NOF	YoGP	FETA	PAR	REGQ
OSS	1.0000																
SMALL	-0.2740	1.0000															
MEDIUM	0.0696	-0.5478	1.0000														
LARGE	0.2390	-0.5792	-0.3647	1.0000													
BANK	-0.0986	-0.2488	0.0329	0.2449	1.0000												
CUC	0.1021	-0.1598	0.0181	0.1602	-0.2458	1.0000											
NBFI	-0.0814	0.2341	-0.0718	-0.1905	-0.2112	-0.4184	1.0000										
NGO	0.0397	0.1236	0.0256	-0.1626	-0.2293	-0.4544	-0.3904	1.0000									
AGE	0.1722	-0.2142	-0.0166	0.2545	-0.1057	0.4562	-0.3544	-0.0540	1.0000								
ASSETS	0.2129	-0.5130	-0.1701	0.7392	0.1877	0.2028	-0.1961	-0.1477	0.3117	1.0000							
OEA	-0.3361	0.2493	-0.0907	-0.1892	0.0824	-0.4137	0.0836	0.2872	-0.2056	-0.2545	1.0000						
LLP	-0.1386	0.0399	-0.0897	0.0424	0.0821	-0.1278	0.1170	-0.0350	-0.1010	-0.0015	0.0897	1.0000					
NOF	0.0745	0.4365	0.0775	0.4060	0.0233	- 0.2246	-0.1962	-0.0570	0.3265	0.5389	-0.1877	-0.0533	1.0000				
YoGP	-0.1234	0.1098	-0.0491	-0.0752	0.1607	-0.4285	-0.1626	0.4793	-0.1942	-0.1512	0.7156	0.1644	-0.1068	1.0000			
FETA	-0.0115	0.1534	0.0652	0.1062	0.1439	-0.1279	0.1358	-0.0994	-0.2220	0.1021	-0.0319	0.2044	0.0836	0.0329	1.0000		
PAR	-0.0862	0.0228	-0.0506	0.0250	-0.0449	0.1347	-0.0680	-0.0374	0.0482	0.0308	0.0050	0.2381	-0.0522	0.0030	-0.0011	1.0000	
REGQ	-0.1094	0.0477	-0.0844	0.0291	0.1747	-0.3773	0.3263	-0.0472	-0.3840	0.0831	0.1354	0.0504	0.0845	0.1074	0.0949	0.0468	1.0000

Source: Compiled by the author using data from the Microfinance Information Exchange

5.2.3 Probit Regression Results

Table 5.3 presents the empirical results obtained from the baseline probit model.

Table 5.3: Baseline Probit Regression Results (Dependent Variable: Financial Sustainability)

Variables	Average Marginal Effects	Standard errors
Small scale deposits ***(SMALL)***	-0.1858238***	0.0708996
Large scale deposits ***(LARGE)***	0.1514733*	0.0831693
Banks ***(BANK)***	-0.2330464**	0.1064675
Credit Union/Cooperatives ***(CUC)***	-0.1457813	0.096051
Non-Bank Financial Institutions ***(NBFI)***	-0.0184364	0.1220781
Experience ***(AGE)***	0.0083692	0.0076451
Size ***(lnASSETS)***	-0.0005532	0.0050372
Efficiency ***(OEA)***	-0.015211***	0.0044688
Loan impairments ***(LLP)***	-0.0271963**	0.0125206
Coverage ***(NOF)***	-0.0027004***	0.0008474
Financial Revenue ***(YoGP)***	0.006436**	0.0028816
Financial expenses ***(FETA)***	-0.0098208	0.0111249
Risk and portfolio quality ***(PAR)***	-0.0089337*	0.0053325
Regulatory quality ***(REGQ)***	-0.1272487	0.0909883
Predicted probability	0.5662	
Percentage of correctly classified results	75%	

Significance levels: *** 1 %, ** 5 % and * 10 %.

Source: Compiled by the author based on estimation results

The adequacy of the results obtained was guaranteed by conducting diagnostic tests (refer to section 4.3.3) that enabled the study to correct for problems which were detected prior to estimation.

i. Scale of Deposits and Financial Sustainability

The probit regression results show that the different scales of operations based on deposit volumes affect the likelihood of the LISSA DTMFIs in attaining financial sustainability in different ways.

Firstly, the results in Table 5.3 reveal that operating with small-scale deposits reduces the likelihood of the LISSA DTMFIs' financial sustainability by 19 %. This result is in line with the findings of Bogan (2012) who found a negative relationship between the deposits to assets ratio and operational self-sufficiency. This may be attributed to the huge transaction costs inherent with mobilising and administering many small deposit balances from a market niche that is sparsely populated or residing in the inconveniently located areas in the LISSA countries (de Sousa-Shields and King, 2005; WDIs, 2017). Another possible explanation could be that the returns to scale for small-scale deposits are negative (Zacharias, 2008). Related findings were reported on the microlending front by Kinde (2012) who found that administering small average balances of loans constrain the attainment of financial sustainability. Moreover, small-scale deposits are likely to be highly transitory or demand deposits that are called up at any time suggesting that they are highly volatile (Bertrand, 2011). This means that small scales of deposits are not always readily available for financing the operations and the loan portfolio indicating that they generate less interest income for boosting financial sustainability. Therefore, the estimated result on small-scale deposits and financial sustainability limits the strength of the theory of financial intermediation that financial intermediaries leverage on deposits that they mobilise to meet the financial needs of deficit units through advancing lines of credit (Werner, 2014; 2016). Thus, in terms of scales of deposits, small-scale deposits are the chief reason why the LISSA DTMFIs fall behind in attaining financial sustainability.

Secondly, the likelihood of financial sustainability is positive and significant when the scale of the operations involves large-scale deposits. The estimated probit model shows that large-scale deposits increase the chance of attaining financial sustainability by 15 %. This indicates that

mobilising few large deposits is less costly and comes along with positive returns to scale. This finding supports Bayai and Ikhide's (2016a, p. 21) conclusion that "deposits attraction augments financial sustainability" and is also consistent with the work of Ngo *et al.* (2014) who found that MFIs that increase their scale of lending operations are financially sustainable. Moreover, this finding is in line with the Institutionalists' theory, as it suggests that the large-scale deposits are most likely to be the deposits of large average balances from the conveniently located and better-off poor folk or the owners of micro-enterprises whose businesses generate profits and surplus cash flows which are then placed in custody with the DTMFIs. Thus, the large-scale deposits are time or term deposits which are held up to maturity hence they are stable deposits that can be intermediated into loans which generate interest income that boosts financial sustainability (Brom, 2009; 2012). The studies of Shaoyan and Duwal (2012) and Mwizarubi *et al.* (2016) also reported a positive relationship between deposits and financial sustainability. However, their studies did not consider the scales of deposit volumes as they measured deposits using the deposits to assets and deposits to loans. In addition, contradictory evidence was reported by Tehulu (2013), Bhanot and Bapat (2014) and Bayai and Ikhide (2018) as they did not find deposits being a significant contributor towards the attainment of financial sustainability. The relationship between medium-scale deposits and the likelihood of attaining financial sustainability was not reported as this scale of deposits was treated as the base category in the estimated probit model.

ii. DTMFI characteristics and Financial Sustainability

Several DTMFI specifics incorporated in the estimated probit model further shed light on why the depository microfinance sector in the LISSA region falls short in attaining financial sustainability. The econometric results presented in Table 5.3 above show that the average marginal effects for the operating expenses ratio, loan loss provisions, number of offices and the portfolio at risk; all reduce the probability of financial sustainability as they are all negative and significant. The negative average marginal effects of the operating expenses ratio reduce the likelihood of financial sustainability by 1.5 %. This finding is in line with the findings of Cull *et al.* (2009b), Rai and Rai (2012) and Tehulu (2013). This could be reflective of a decreasing trend in the average deposit balances that are mobilised by the LISSA DTMFIs as shown in Figure 5.1. This entails that mobilising very small deposit balances is embedded with high transaction and administration costs that increase the operating expenses (de-Sousa-Shields and King, 2005). As

a result, a high operating expenses ratio depletes the operating revenues that contribute to financial sustainability.

In line with the findings of Ayayi and Sene (2010) as well as Tehulu (2013) and the MIX's annual reports, it is not surprising that the probit regression results show that deteriorating loan portfolio quality (portfolio at risk > 30 days) decreases the likelihood of attaining financial sustainability of the LISSA DTMFIs by 0.9 %. Earlier MIX evidence revealed that between the years 2006 and 2010, the portfolio at risk > 30 days ratio for the MFIs in SSA was the highest when compared to that of other world's regions (MIX and CGAP, 2012). Recent MIX evidence also shows that the portfolio at risk > 30 days ratio for the years 2014 to 2018 in SSA was much higher than the international benchmark of 5 % especially in the years 2014 and 2015 (MIX, 2014; 2015; 2016; 2019). Thus, the estimated result suggests that because of the high portfolio at risk > 30 days ratios, the LISSA DTMFIs are forced to readjust their loan loss provisions upwards. As a result, the loan impairment provisions decrease the probability of the LISSA DTMFIs in achieving self-sufficiency by 2.7 %. Contrary to the findings of this study, the empirical work of Nwachunkwu *et al.* (2018) found that readjusting loan loss provisions upwards exerts upward pressure on the lending interest rates which boost financial sustainability. Subsequently, another supporting study by Hessou *et al.* (2019) advocates that adjustments for loan loss provisions in the microfinance sector should be done with careful regard as business cycles change.

The number of offices reduces the likelihood of financial sustainability by 2.7 %. The study of Awaworyi and Marr (2014) also reported a negative relationship between the number of offices and financial sustainability. As reported in the descriptive statistics in Table 5.1, an average DTMFI has 24 offices indicting that too much financial, human and material resources are spent in their establishment in the form of capital and revenue expenditure. As a result, the incremental working capital expenditures for running and maintaining these offices are costly and erode the operating revenues generated thereby reducing the likelihood of attaining financial sustainability (Twaha and Rashid, 2013).

Of the charter types' dummies, only the average marginal effects for the BANKs are significant but negative. This could be attributed to failure to downscale operations profitably. As BANK-DTMFIs stretch their hands to reach the previously unbanked poor and the rural LISSA

populations, they suffer from hefty operational costs that follow the exercise. This decreases their interest revenues thereby chocking the chances of attaining financial sustainability.

The average marginal effects for the CUC and NBFI charter type dummies were found to be insignificant in expounding the chance of attaining financial sustainability. Nonetheless, Shaoyan and Duwal (2012) found contrasting results as they reported that CUC DTMFIs are financially sound due to their dependence on deposits as their main source of financing operations, investments and boosting equity. The NGO-DTMFIs dummy variable was the base category.

The average marginal effects for the real yield on the gross portfolio were positive and significant in explaining the chance of attaining financial sustainability by 0.6 % thereby supporting the empirical work of Rai and Rai (2012), Bayai and Ikhide (2018) as well as Nwachunkwu *et al.* (2018). This indicates that the interest earned from the lending operations of the LISSA DTMFIs increases the prospects of attaining financial sustainability.

Experience in deposit-taking as reflected by the AGE average marginal effects was insignificant in explaining the performance of LISSA DTMFIs in terms of financial sustainability. However, the earlier work of Ndambu (2011) showed that ageing contributes to financial sustainability. This means that proficiency in handling and administering deposits from the poor and the low-income clientele is gained with the increasing number of years in business. The study of Wijesiri *et al.* (2015) reported a negative and significant relationship between age and financial sustainability thereby contradicting Ndambu (2011) as well as the findings of this study.

The average marginal effects for the log of assets and financial expenses ratio were insignificant in explaining the likelihood of the financial sustainability of the LISSA DTMFIs. The descriptive statistics in Table 5.1 above indicated that an average LISSA DTMFI has an average total assets size of US$20 949 463. Thus, the obtained probit regression results suggest that these financial service providers are not benefiting from the economies of scale that are derived from operating with a large asset base (Ndambu, 2011; Mwizarubi *et al.*, 2016). However, Bhanot and Bhapat (2014) found that leveraging on the size of the gross loan portfolio augments the attainment of financial sustainability. The insignificant average marginal effects of the financial expenses' ratio are not in line with the a priori expectations in explaining the likelihood of the LISSA DTMFIs' financial sustainability. Since deposit financing is relatively cheaper than the alternative

sources of finance, it was expected that the average marginal effects for the financial expenses' ratio are a positive contributor to the likelihood of the LISSA DTMFIs' financial sustainability.

iii. Country-Specific and Financial Sustainability

The macroeconomic variable (regulatory quality) was found to be negative but was statistically insignificant with financial sustainability in line with the findings of El-Maksoud (2016). This was against the a priori expectation of a negative influence of regulatory quality in working towards achieving financial sustainability. Regulation of DTMFIs is inevitable as the microdepositors cannot themselves, monitor the use of their savings by these institutions (Christen *et al*., 2003; CGAP, 2012). As noted in empirical evidence, regulation which is the safeguard for microdepositors, is embedded with compliance costs that erode the operating revenues thereby stifling attainment of financial sustainability (Cull *et al.,* 2009b). On the contrary, Nyanzu and Perprah (2016) found a positive relationship between regulatory quality and financial sustainability.

iv. Predicted Probability and Correctly Classified Results

The predicted probability from the estimated probit model shows that on average, only 57 % of the LISSA DTMFIs are financially sustainable. This means that 43 % of the LISSA DTMFIs are lagging behind in achieving financial sustainability. This finding concurs with the empirical work of Ek (2011) that financial sustainability is hardly achieved by African MFIs despite their rampant efforts to achieve this financial objective. The percentage of correctly classified results which indicates the predictive power of the estimated probit model was very high as it stood at 75 %.

iv. Robustness Check

As a robustness check, Table 5.4 presents robustness regression results for the scales of deposits using the logit model. The robustness check results corroborate the baseline results as the signs and the levels of significance of the estimated average marginal effects were the same for all the variables except for the regulatory variables.

Table 5.4: Robustness Check Logit Regression Results (Dependent Variable: Financial Sustainability)

Variables	Average Marginal Effects	Standard errors
Small scale deposits ***(SMALL)***	-0.1799337***	0.0611969
Large scale deposits ***(LARGE)***	0.1500104**	0.0765552
Banks ***(BANK)***	-0.2304067***	0.0857004
Credit Union/Cooperatives ***(CUC)***	-0.1530044	0.079784
Non-Bank Financial Institutions ***(NBFI)***	-0.0121201	0.0787389
Experience ***(AGE)***	0.0084481	0.005314
Size ***(lnASSETS)***	-0.0010109	0.0042523
Efficiency ***(OEA)***	-0.0155632***	0.0026063
Loan impairments ***(LLP)***	-0.0270151**	0.0128665
Coverage ***(NOF)***	-0.0026565***	0.0008884
Financial Revenue ***(YoGP)***	0.0066038**	0.0024309
Financial expenses ***(FETA)***	-0.0098343	0.0099021
Risk and portfolio quality ***(PAR)***	-0.0078102*	0.0046015
Regulatory quality ***(REGQ)***	-0.1246008*	0.0766673
Predicted probability	0.5660	
Percentage of correctly classified results	74.32%	

Significance levels: *** 1 %, ** 5 % and * 10 %.

Source: Compiled by the author based on estimation results

The regulatory quality variable was insignificant in the baseline probit results but it was negative and significant in explaining the likelihood of attaining financial sustainability in robustness check logit results. This was contrary to findings of Nyanzu and Perprah (2016) who

found a positive relationship between regulatory quality and financial sustainability indicating that effective and efficient regulatory quality promotes financial sustainability. The predicted probabilities and the percentage of correct classified results in the baseline model of 0.5662 and 75.00 %, respectively, and those for the robustness check models were 0.5660 and 74.32 %, respectively. Thus, these results were almost similar as only slight variations were observed in line with the theory on binary response models.

The next section discusses the estimated results for examining the second objective of the study on liquidity and deposit insurance.

5.3 Results for Liquidity and Deposit Insurance

This section discusses the results of the second objective of the study in three categories; descriptive statistics, pairwise correlations and random effects regression.

5.3.1 Descriptive Statistics

Table 5.5 presents the overall summary statistics for the variables used in the study.

Table 5.5: Descriptive Statistics for the variables used (Liquidity and Deposit Insurance)

Variable	Mean	Std.Dev	Min	Max
Non-earning liquid assets to total assets (NELATA)	22.338	14.835	-.95	84.54
Capital adequacy (CAR)	62.67	63.239	-149.8	463.93
Deposits to loans (DTL)	43.07	42.828	-9.26	711.57
Gross loan portfolio (GLP)	13638761.2	22034670.9	3646	152156829
Yield on Gross loan portfolio (YoGP)	26.796	16.245	-16.06	80.13
Loan loss rate (LLR)	1.604	3.168	-9.83	21.54
Total expenses to total assets (TETA)	28.360	18.580	-8.48	173.73
Consumer price index (CPI)	6.779	7.002	-8.97	44.36

Source: Compiled by the author using data from the Microfinance Information Exchange

The mean for the liquidity ratio (NELATA) is 22.34 % suggesting that on average, the LISSA's depository microfinance sector as a whole is liquid. However, this is not the case with individual DTMFIs as reflected by the minimum NELATA value of -0.95 indicating that liquidity is a cause for concern across individual institutions. The maximum NELATA value of 84.54 % is an indicator that some of the LISSA DTMFIs have too much liquidity which is tied up in non-earning assets resulting in losses due the opportunity cost of holding excess liquid reserves.

The standard deviation of the CAR ratio is 63.24 % and that of the DTL is 42.83 % while their means are 62.67 % and 43.067 % respectively, indicating that there is very high variation in capital adequacy and financing of the sampled DTMFIs relative to their means. The high mean of the CAR variable may be a direct regulation effect that MFIs should have high CARs than banks since they deal with high-risk clients (Berger, 2010). The high mean for the DTL ratio may be explained by the high volumes of the voluntary deposits mobilised by the DTMFIs in LISSA.

The standard deviations of liquidity (NELATA), financial revenue (YoGP), loan portfolio risk (LLR) and the inflation rate (CPI) ranged from 3.168 % to 16.25 % indicating very minimal variations in the observations of these variables. The minimum value of the inflation rate is -8.97 % indicating that some of the countries of the sampled DTMFIs experience deflation while the maximum value of the inflation rate is 44.36 % indicating that some of the countries of the sampled DTMFIs suffer from a persistent rise in the general price level. The descriptive statistics for size (GLP) were an outlier as its absolute values were unlike the other variables which were expressed in percentage terms.

5.3.2 Correlation Analysis

Table 5.6 presents the results of the pair-wise correlations for the variables that were used to examine the relationship between liquidity and deposit insurance. Most of the correlations in the correlation matrix do not show evidence of severe multicollinearity since they are all less than the cut-off point of 0.70 (Kennedy, 2008). The relationship between liquidity and deposit insurance is weak but positive. Nonetheless, this suggests that designing and implementing deposit insurance packages helps to avert exposure to liquidity risk amongst the sampled DTMFIs. This result is further reinforced by the positive and much stronger relationship between liquidity and capital adequacy which is a prudential regulation requirement and the BASEL dummy (Berger, 2010).

Thus, deposit protection measures help to curb the risk that the DTMFIs may fail to honour their obligations to depositors.

Table 5.6: Correlation Analysis for the variables used for analysing Liquidity and Deposit Insurance

	NELATA	DEPINSU	CAR	BASEL	DTL	GLP	YoGP	LLR	TETA	CPI
NELATA	1.000									
DEPINSU	0.1145	1.000								
CAR	0.3503	-0.0752	1.000							
BASEL	0.1440	-0.2057	0.0581	1.000						
DTL	0.1293	-0.0786	-0.3451	0.1377	1.000					
GLP	-0.0823	0.0426	0.0912	-0.2537	-0.0467	1.000				
YoGP	0.0786	0.2110	-0.1829	0.3733	0.1781	-0.1486	1.000			
LLR	0.1325	0.0686	0.1287	0.1545	0.0654	-0.0498	0.2268	1.000		
TETA	0.0012	0.1403	-0.1657	0.3051	0.1172	-0.2354	0.7106	0.1702	1.000	
CPI	0.1900	0.0677	0.0643	0.2569	0.0709	-0.2261	0.0670	0.0851	0.2566	1.000

Source: Compiled by the author using data from the Microfinance Information Exchange

The risk associated with loan book losses, deposit financing and the general price level, also have a positive and weak relationship with liquidity. Size as measured by the GLP variable has a negative and weak relationship with liquidity. This shows that magnifying the volume of the gross loan portfolio by disbursing larger long-term loans using smaller short-term deposits exposes the DTMFIs to liquidity risk due to asset and liability mismatches (Bruett, 2004; Mata, 2011; Ogol, 2011; Mucheru *et al.,* 2018). The positive relationship between the loan loss rate and capital adequacy suggests that maintaining adequate equity to total assets ratios helps to absorb bad debts in the loan book. The positive relationship between the loan loss rate and the yield on the gross loan portfolio gives the impression that decreases in loan losses result in increases in interest income thereby boosting liquidity.

5.3.3 Random Effects Regression Results

Table 5.7 below presents the estimated results based on the baseline random effects panel framework. The adequacy of the results was confirmed by conducting diagnostics (refer to section 4.4.3) that enabled the study to correct for problems which were detected prior to estimation.

Table 5.7: Regression Results from the Random Effects Model

Variables	Coefficients	Robust standard errors
Deposit insurance ***(DEPINSU)***	0.5787688***	0.207658
Capital adequacy ***(lnCAR)***	0.2202193**	0.106039
Basel implementation ***(BASEL)***	0.3948125*	0.2053999
Financing ***(lnDTL)***	0.0196915	0.1073799
Size ***(lnGLP)***	-0.094004*	0.0544958
Financial revenue ***(lnYoGP)***	-0.0289048	0.1853313
Risk ***(lnLLR)***	0.0753728	0.0652687
Expenses ***(lnTETA)***	-0.1667738	0.2304719
Inflation ***(lnCPI)***	0.0130675	0.0406344
Constant	3.790338***	1.231483
sigma_u	0.49151681	
sigma_e	0.60018813	
Rho	0.40143391	
R-squared	0.1638	
Wald statistic: chi(7)	31.00	
Prob>chi2	0.0003	

***, ** and * denote statistical significance at 1 %, 5 % and 10 % levels, respectively.

Source: Compiled by the author based on estimation results

The results show that at the 1% level of significance, deposit insurance is a positive and highly significant determinant of liquidity for the depository microfinance sector in the LISSA countries. This result is in line with the a priori expectations as well as the correlation analysis results. Deposit insurance therefore boosts liquidity or guarantees the short-term survival of the depository microfinance sector when faced with runs on deposits. This finding is consistent with the arguments of the founders of the theory of deposit insurance (Diamond and Dybvirg, 1983) that the presence of deposit insurance schemes can stimulate the confidence of the depositors in encouraging them to lodge their savings with DTMFIs (Ngalawa, 2012). This leads to an improvement in the level of liquid resources available for DTMFIs.

Assured safety of deposits through insurance cover ensures continual cash inflows that improve the liquidity of the DTMFIs as new depositors are attracted, the run-away depositors are called back and the existing depositors are maintained. This way, deposit insurance benefits both the DTMFIs and the depositors as their liquidity preferences will be not be threatened. In addition, it means that the LISSA DTMFIs will be able to even out the supply of liquidity; meeting withdrawals, interest on deposits and extending lines of credit in line with the provision of the liquidity arm of the theory of financial intermediation. On the contrary, the empirical work of Ngalawa (2012) on deposit insurance and banking instability found that the vulnerability of the banking systems to bank runs and insolvency in low-income countries where deposit insurance schemes are minimal are not so marked than the vulnerability of the counterpart banking systems in non-low-income countries. Furthermore, that study also found that the effects of deposit insurance schemes are country-specific.

The findings of this study on the relationship between liquidity and deposit insurance are supported by the empirical work of Anginer *et al.* (2013) who found that the adoption of deposit insurance minimises exposure of banking institutions during times of financial crises. Contrary to the findings of this study, Anginer *et al.* (2013) found that the adoption of deposit insurance during the pre-crisis era resulted in increased bank risk. After combining the pre-crisis and the during crisis results, the net effect of deposit insurance was negative. This means that deposit insurance cover has the potential to expose DTMFIs to liquidity risk to the detriment of the depositors especially when moral hazard outweighs the benefits of the insurance cover (Carroll and Takayama, 2010). Hence, empirical writers warn that deposit-taking financial institutions trigger

moral hazard problems when they abuse deposit insurance schemes by engaging in high-risk transactions leveraging on the insurance cover as the fallback (McCoy, 2007; Carroll and Takayama, 2010; Hughes and Mester, 2013; Calomiris and Jaremski, 2016).

As per the a priori expectation and congruent with the correlation analysis results, the capital adequacy ratio and the BASEL dummy are positive determinants of liquidity of the LISSA DTMFIs at the 5 % and 1 % levels of significance, respectively. These results show that with adequate equity to total assets levels, DTMFIs in the LISSA region can be able to withstand liquidity risk. This finding is consistent with Hessou *et al.* (2019) who found that capital adequacy shields MFIs from risks associated with loan loss provisions thereby improving their liquidity and guaranteeing their short-term survival. In another study, Zamore (2018) found that by absorbing risks faced by MFIs, capital adequacy guarantees their survival in the long term. Nonetheless, in a study by Mecagni *et al.* (2015), it was reported that only 7 out of 27 LISSA countries had implemented the Basel framework capital adequacy standards by the year 2015. This indicates that non-implementation of the Basel's recommendations on capital adequacy exposes the LISSA DTMFIs to liquidity risk which thwarts their ability to honour their obligations to low-income depositors.

The deposits to loans coefficient which measures the extent to which the mobilised deposits (internal funds) finance the gross loan portfolio are positive but statistically insignificant despite that the deposit volumes outweigh the gross loan portfolio in the LISSA countries (MIX, 2015). Internal funding through deposits to finance the loan book is expected to positively influence liquidity due to the few conditions attached to them, their comparatively low cost and the less managerial implications (Roodman and Quereshi, 2006; Ledgerwood *et al.*, 2006; Lützenkirchen and Weistroffer, 2012). Moreover, Kipesha (2012) found that reliance on external funding than internal funding to finance loan portfolios and other operations erodes liquidity.

The coefficient of size as measured by the logarithm of the gross loan portfolio was found to be statistically significant but negatively related to the NELATA ratio at the 10 % level of significance. This result contradicted the a priori expectations but verified the results in the correlation matrix in Table 5.6. This indicates that size is a negative determinant of liquidity due to diseconomies of scale which are associated with huge establishments and operational costs of expanding the gross loan portfolios as the DTMFIs spread their wings through extensive branch

networks. Contrary to the findings of this study, Wambui and Wanjiru (2016) found that the liquidity of microfinance banks is positively affected by the intensity of their loans. Moreover, Laureti and Szafarz (2016) found no evidence of size in influencing the liquidity premium of banking institutions and MFIs. Nonetheless, Bayai (2017) found a negative link between the gross loan portfolio and long-term financial performance. Therefore, this gives the impression that when measured using the gross loan portfolio size has a negative association with both short-term financial performance (liquidity) and long-term performance (financial sustainability). Financial revenue measured using the real yield on the gross loan portfolio is negative and insignificant with liquidity indicating that interest and non-interest income earned does not significantly contribute to cash availability. Unlike the study of Wambui and Wanjiru (2016) which found that losses on the loan portfolio erode liquidity of MFIs, this study found that the loan loss rate coefficient was negative but statistically insignificant in explaining liquidity. Based on the findings of Wambui and Wanjiru (2016), the negative sign of the loan loss rate coefficient may indicate that impairment of loans and unrecovered bad debts erode liquidity due to a reduction in cash inflows.

The inflation rate coefficient was found to be positive but statistically insignificant in explaining the liquidity of the LISSA DTMFIs. This finding is contrary to the study of Chikoko and Kwenda (2013) as well as that of Bichanga (2016) which found that inflation influences the liquidity of MFIs. In the correlation matrix in Table 5.6, the inflation rate was found to have a positive relationship with liquidity. Based on the findings of Bichanga (2016) who found a positive link between the inflation rate and the gross loans and advances to customer deposits, the results of this study may indicate that the poor and the low-income households are borrowing less from the DTMFIs as the repayment interest rates are raised by the inflation premium. Less borrowing results in the reduction of cash outflows and ultimately, improvement in the liquidity position. On the deposit-taking side, the positive inflation rate coefficient may reflect that the DTMFIs guard against withdrawals of deposits by offering high returns or that their deposit portfolios mainly consist of term deposits which are largely withdrawn upon maturity. This keeps the liquidity position immune from inflationary pressures.

i. Endogeneity Test Regression and Robustness Check Results

Table 5.8 shows the regression results from the 2SLS and OLS methods which were used for testing for endogeneity and the robustness check results using the GLS method.

Table 5.8: Endogeneity Test Regression Results (2SLS vs OLS) and Robustness Check Results (GLS)

Variables	2SLS	OLS	GLS
Deposit insurance ***(DEPINSU)***	0.6155607*** (0.2228636)	0.6180795*** (0.193474)	0.6180795*** (0.2157771)
Capital adequacy ***(lnCAR)***	0.3961102*** (0.1018761)	0.3881079*** (0.099158)	0.3881079*** (0.095772)
Basel implementation ***(BASEL)***	0.4282132** (0.1821896)	0.4138962** (0.1874703)	0.4138962** (0.186475)
Financing ***(lnDTL)***	0.1511954 0.1518473	0.124481 (0.1210152)	0.124481 (0.103302)
Size ***(lnGLP)***	-0.0350885 (0.164141)	-0732644* (0.0403552)	-0.07362644* (0.0428482)
Financial revenue ***(lnYoGP)***		0.0533835 (0.1629462)	0.0533835 (0.1830697)
Risk ***(lnLLR)***		0.0036274 (0.0514208)	0.0036274 (0.0492469)
Expenses ***(lnTETA)***	0.0117432 (0.1867782)	-0.0620286 (0.2103749)	-0.062086 (0.2002215)
Inflation ***(lnCPI)***	-0.0063267 (0.0614483)	-0.0017448 (0.0531195)	-0.0017448 (0.0639043)
Constant	1.100097 (3.614094)	1.873315 (1.245233)	1.873315 (1.213018)
Root MSE	0.79156	0.81364	
R-squared	0.1844	0.1883	
F Statistic		7.70	
Wald statistic: chi(7)	36.76		39.91
Prob>chi2	0.0000	0.0000	0.0000

***, ** and * denote statistical significance at 1 %, 5 % and 10 % levels, respectively. Standard errors are in parenthesis. The OLS column reported robust standard errors.

Source: Compiled by the author based on estimation results

Since endogeniety of the suspected explanatory variable (size proxied by the logarithm of the gross loan portfolio – *lnGLP*) was not found, the OLS method was preferred as it is more superior to the 2SLS method under no endogeniety situations. Furthermore, Table 5.8 shows results of the OLS regression and the GLS regression. As indicated in section 4.4.3, the GLS regression results were considered as a robustness check for the baseline random effects regression results since the GLS method is a more efficient and consistent estimator than the OLS method. Table 5.8 also shows that the results in the columns for the OLS and GLS methods both corroborated the results of the baseline probit regression results shown in table 5.7 in terms of the significant variables and their signs, except for the magnitude of the coefficients. In the column for the 2SLS regression results, the results for the financial revenue *(lnYoGP)* and risk *(lnLLR)* variables were not reported as these variables were treated as instrumental variables in the test for endogeniety. The size variable *(lnGLP)* which was treated as an endogenous variable was not significant in explaining the liquidity of the LISSA DTMFIs contrary to the baseline random effects, OLS and GLS models' regression results. However, the 2SLS regression results for the deposit insurance, capital adequacy and Basel implementation variables were in line with baseline random effects regression results and those of the OLS and GLS methods.

The next section discusses the results for addressing the third objective of the study.

5.4 Results for Outreach and Financial Sustainability

This section discusses the results of the third objective of the study on outreach and financial sustainability in three categories; descriptive statistics, pairwise correlations and dynamic panel data regression, the System Generalised Method of Moments.

5.4.1 Descriptive Statistics

i. Descriptive Statistics of the Variables used

Table 5.9 shows the descriptive statistics of the variables that were used in the study.

Table 5.9: Descriptive Statistics for the variables used (Outreach and Financial Sustainability)

Variable	Mean	Std. Dev.	Min	Max
Average deposit balance per depositor/GNI (AVDGNI)	39.058	70.946	0	691
Number of Depositors (NODEP)	78958.59	139880.5	40	1148561
Operational Self Sufficiency (OSS)	99.848	32.758	0.38	228.12
Percentage of Women Borrowers (POW)	61.557	25.782	0	100
Deposits to Total Assets (DTA)	41.889	24.051	0	103.77
Depositors per Staff Member (DEPSTAME)	340.542	304.229	0	2280
Number of Years (AGE)	16.900	6.604	7	41
Assets (ASSETS)	2094946.7	35134719.8	157185	214144887
Portfolio at Risk (PAR)	6.865	7.964	-14.57	97
Commercial Bank Branches (ComBB)	2.762	1.485	0.36	9.46
Rural Population (RPOP)	69.713	12.210	42.9	90.38

Source: Compiled by the author using data from the Microfinance Information Exchange

The average deposit balance per depositor/GNI in the LISSA region is 39.06 % and is very small. This gives the impression that the LISSA DTMFIs are socially oriented institutions that mobilise small average deposit balances which deepen their outreach goal. The mean value of the number of depositors is 78 959 indicating the size of the scale of operations of an average LISSA DTMFI. The wide disparity between the minimum and maximum values of the number of depositors, 40 and 1 148 561 respectively, suggests that some DTMFIs operate on a very small-scale with very few depositors and others operate on a large-scale with many depositors. The mean value of operational self-sufficiency of 99.85 % depicts that on average, the LISSA DTMFIs are self-sufficient institutions as this value is equal to 100 % when rounded up. Based on these descriptive statistics, it means that these depository institutions should be able to cover their operational and financial costs with ease.

The deposits to assets variable averaged 41.89 % over the period suggesting that the LISSA DTMFIs are adequately financed using deposits and are effective in intermediating deposits into loans since the mean value doubled the 20 % threshold. The maximum value of the deposits to assets variable of 103.77 % is in line with the MIX's annual reports that the microfinance sectors in SSA is largely financed through the huge deposit volumes that they mobilise. In terms of productivity, the personnel who work in the LISSA DTMFIs serve 341 depositors on average. The AGE variable statistics show that on average, the depository microfinance sector in the LISSA countries is largely composed of young and mature DTMFIs. These AGE statistics are in line with the empirical works of Bogan (2012) and Bayai and Ikhide (2016a) who applied the life cycle theory to the financing of the MFIs as they age.

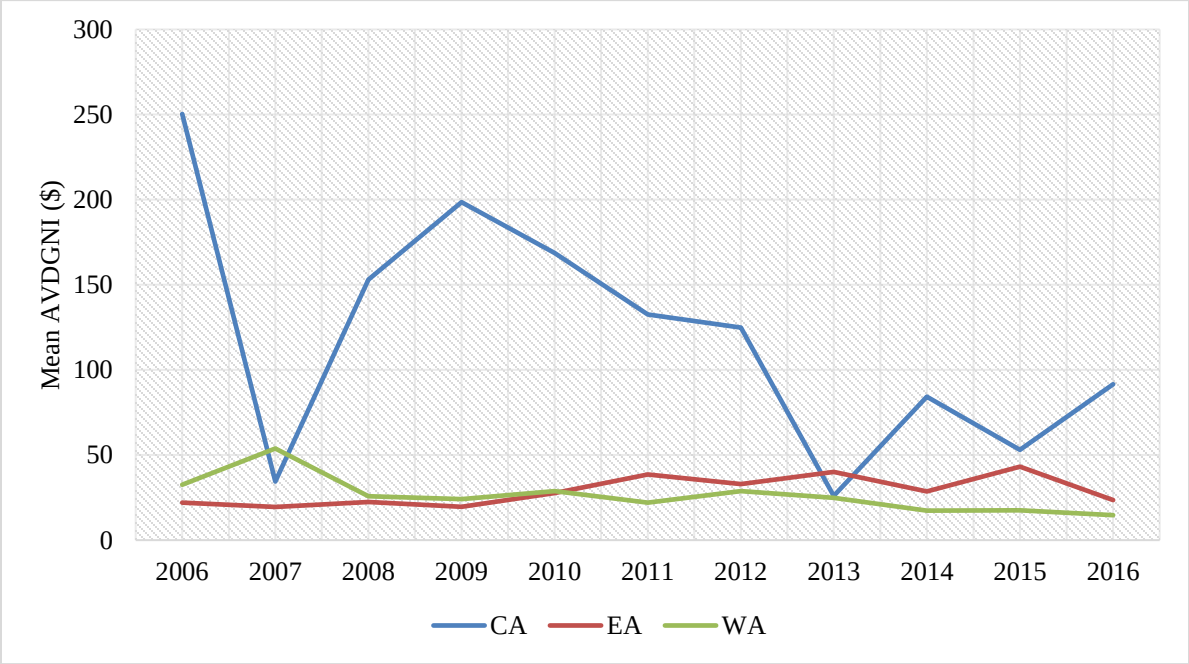
The portfolio at risk variable average of 6.89 % which is above the international benchmark of 5 % shows that declining loan portfolio quality cripples the efficiency of the depository microfinance sector in the LISSA region in outreach performance. The proliferation of commercial banks of 3 branches per 100 000 adult population is an indicator of competition for customers. The average value of the rural population percentage variable of 69.71 % shows that there are vast masses of people that reside in the rural areas in the LISSA countries.

ii. Descriptive Statistics on the Average Deposit Balance per Depositor/Gross National Income per Capita

Figure 5.1 below shows the mean values of the average deposit balances divided by their GNI per capita of the DTMFIs from the sub-regions of LISSA (Central Africa, Western Africa and Eastern Africa) between the years 2006 and 2017. At the onset of the period under consideration, Figure 5.1 shows that the highest AVDGNI was recorded by Central Africa DTMFIs. The lowest AVDGNI was recorded by Western Africa DTMFIs at the outset of the period. Figure 5.1 also shows that there were sharp upward and downward swings in the AVDGNI for Central Africa DTMFIs between 2006 and 2016 depicting an unstable trend. The steep increases in the level of the AVDGNI between 2007 and 2009 for the Central African DTMFIs indicate their shift of focus from the pro-poor depositors whose deposit balances are small, to the better off depositors who lodge large deposit sizes (MIX, 2007). The sharp decrease in the

AVDGNI in 2007 and 2013 of the Central African DTMFIs depict intensification of their deposit outreach programs to the pro-poor whose savings were of small average balances.

Figure 5.1: Average Value for the Average Deposit Balance per Depositor/Gross National Income per Capita for LISSA's Sub-regions between 2006 and 2016



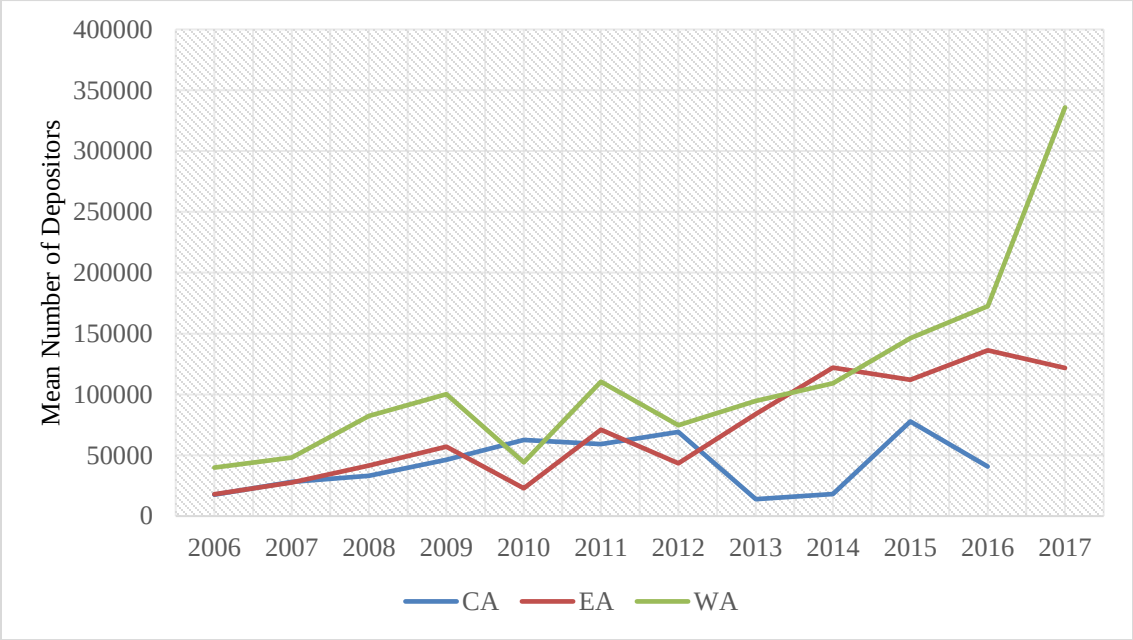
Source: Compiled by the author using data from the Microfinance Information Exchange

The changes in the AVDGNI for Eastern Africa and Western Africa DTMFIs over time were very small as the variations were not very significant. According to the MIX and CGAP (2011), the small average balances on deposits across these two sub-regions as from the year 2013 reflect the emphasis by the DTMFIs on serving the poorest depositors.

iii. Descriptive Statistics on the Number of Depositors

Figure 5.2 shows the mean in the number of depositors of DTMFIs from LISSA's sub-regions between the years 2006 and 2017.

Figure 5.2: Average Value for the Number of Depositors for LISSA's Sub-regions between 2006 and 2017



Source: Compiled by the author using data from the Microfinance Information Exchange

In line with the overall growth trends for the entire SSA depository microfinance sector, Figure 5.2 shows that there were upward trends in the growth of the number of depositors for all the LISSA's sub-regions over time (MIX and CGAP, 2010; MIX, 2014, 2015, 2016). The phenomenal growth in the number of depositors is attributed to the tireless efforts of the LISSA DTMFIs in serving the poor and the low-income households with micro-financial services. However, the Central Africa DTMFIs recorded declines between 2012 and 2014 and in 2016. The number of depositors from Western Africa DTMFIs skyrocketed after 2014 and reached maximum of 335 822 depositors in 2017 which was 2.76 times greater than the number of depositors from Eastern Africa DTMFIs.

5.4.2 Correlation Analysis

Table 5.10 shows the results of the pairwise correlations for the variables used in the study.

Table 5.10: Correlation Analysis for the variables used for analysing Outreach and Financial Sustainability

	AVDGNI	NODEP	OSS	PFB	DTA	DEP STAME	AGE	ASSETS	PAR	ComBB	RPOP	CA	EA	WA
AVDGNI	1.0000													
NODEP	-0.0192	1.0000												
OSS	0.1117	0.0574	1.0000											
POW	-0.3253	-0.1214	-0.0935	1.0000										
DTA	0.3727	0.4072	0.1175	-0.3244	1.0000									
DEPSTAME	-0.1303	0.5561	0.2072	0.0811	0.3289	1.0000								
AGE	0.0694	0.2353	0.2631	-0.0866	0.1939	0.1847	1.0000							
ASSETS	0.3162	0.6452	0.1506	-0.1781	0.3539	0.2363	0.3117	1.0000						
PAR	0.0048	0.0082	-0.0968	-0.1705	0.1409	0.0101	0.0482	0.0308	1.0000					
ComBB	0.2108	0.2548	0.0645	-0.0442	0.1715	0.2264	-0.0243	0.1949	0.1349	1.0000				
RPOP	-0.0903	-0.1618	0.0139	0.0093	-0.2260	-0.0352	-0.1365	-0.3067	-0.0286	-0.2734	1.0000			
CA	0.4481	-0.0768	0.0616	0.1253	-0.1040	-0.0988	0.0917	0.0565	-0.0461	-0.4568	-0.2029	1.0000		
EA	-0.1262	-0.1035	-0.0452	-0.2503	0.0218	-0.1811	-0.3197	-0.2496	-0.0420	-0.1165	0.6988	-0.3127	1.0000	
WA	-0.1463	0.1507	0.0108	0.1776	0.0413	0.2418	0.2700	0.2195	0.0693	0.3838	-0.5887	-0.2714	-0.8294	1.000

Source: Compiled by the author using data from the Microfinance Information Exchange

The operational self-sufficiency variable is positive with the depth of outreach (AVDGNI) indicating the presence of mission drift suggesting a move towards focusing on the better-off depositors who save large amounts of their funds periodically (Churchill and Marr, 2017). According to Robinson (2004), larger average deposit balances result in increased profits which boost financial sustainability. The correlation matrix also shows a positive relationship between financial sustainability and the number of depositors (NODEP) suggesting that there is no trade-off in outreach breadth. Thus, reaching out to as many customers as possible boosts financial sustainability.

Focus on women clientele is negative with deposit financing, financial sustainability, breadth and depth of outreach. However, theory suggests that focusing on women is a positive indicator of the depth of outreach (Ann and Tam, 2013). Deposit financing and intermediation is positively correlated with the two outreach dimensions and with financial sustainability. Productivity, as indicated by the depositors per staff member variable, is negative with outreach depth indicating that processing small amounts of deposits from the poorest clientele stifles the proficiency of the deposit-taking personnel. The productivity of the deposit-taking staff members, however, is positive with the breadth of outreach which gives the impression that there is a direct relationship between the depositors per staff member variable and the number of depositors served. Experience is positively related to outreach depth and breadth self-sufficiency, productivity and financing. While portfolio quality is weakly related to outreach depth and breadth, size has much stronger relationships with outreach depth and breadth.

The proliferation of commercial banks is positively related to outreach depth and breadth suggesting that these institutions prefer large deposit balances as they reach out to a vast number of depositors. The percentage of rural dwellers is negative with outreach depth and breadth suggesting that serving this target group is very costly. The sub-regional dummies have varying relations with outreach depth and breadth. The signs, either positive or negative, suggest that the sub-regional factors pose opportunities or threats to the existence of the DTMFIs in the financial inclusion agenda of increasing financial access to the poor and low-income households to get them out of their poverty level.

5.4.2 System Generalised Method of Moments Regression Results

Table 5.11 shows the estimation results of the SGMM technique for the two outreach models.

Table 5.11: System Generalised Method of Moments Results for LISSA and Non-LISSA DTMFIs (Dependent Variables: AVDGNI and lnNODEP)

	LISSA DTMFIs		Non-LISSA DTMFIs	
	1	**2**	**3**	**4**
Variables	**AVDGNI**	**lnNODEP**	**AVDGNI**	**lnNODEP**
Lagged dependent variable	0.3220842*	0.5985122***	0.5886173*	0.4300257*
	[0.191]	[0.194]	[0.297]	[0.256]
Financial sustainability ***(OSS)***	-0.0120457	-0.0028037**	-0.0061762	-0.0013667
	[0.087]	[0.001]	[0.099]	[0.002]
Financial intermediation ***(DTA)***	0.8370487**	0.0006808	0.0039353	0.008721
	[0.410]	[0.003]	[0.121]	[0.006]
Productivity ***(DEPSTAME)***	-0.090919***	0.0015744**	0.0192184	0.0000713
	[0.036]	[0.001]	[0.034]	[0.0004]
Experience ***(AGE)***	-0.1560299	-0.0048697	-0.6788366	0.0172496
	[0.491]	[0.009]	[0.794]	[0.032]
Gender ***(POW)***	0.1437431	-0.001912	0.2353173	0.0039261
	[0.141]	[0.003]	[0.313]	[0.009]
Size ***(lnASSETS)***	3.094286	0.2623647*	3.970207	0.4261237**
	[2.691]	[0.142]	[2.935]	[0.190]
Risk and portfolio quality ***(PAR)***	-0.7854077	0.0001223	0.5436917	-0.0227735
	[0.813]	[0.005]	[0.651]	[0.022]
Competition ***(ComBB)***	3.885022*	-0.2344905	0.0948781	-0.3309803
	[2.208]	[0.159]	[2.916]	[0.276]
Location ***(RPOP)***	1.801151***	-0.019813	-0.6370262	0.0210591
	[0.609]	[0.013]	[0.396]	[0.017]
Central Africa ***(CA)***	40.61682***	-0.7826032*	26.45515	-1.841606**
	[15.878]	[0.450]	[17.478]	[0.916]
Western Africa ***(WA)***	28.38413***	-0.417262*	-.28.49342*	1.12536
	[11.181]	[0.221]	[15.500]	[0.798]
Eastern Africa ***(EA)***			17.30637*	-1.029407**
			[7.657]	[0.461]
Number of Observations	172	185	111	112
Time Dummies	Yes	Yes	Yes	Yes
Number of Groups	53	55	30	30
Number of Instruments	43	36	29	29
GMM Instrument Lag	1	1	1	1
AR(1)	0.004	0.063	0.223	0.077
AR(2)	0.224	0.379	0.292	0.229
Hansen Test	0.126	0.267	0.054	0.294

***, ** and * denotes 1 %, 5 % and 10 % significance level, respectively. The figures in brackets are robust standard errors.

Source: Compiled by the author based on estimation results

The adequacy of the results obtained was ensured by conducting diagnostic tests (refer to section 4.5.3) that enabled the study to correct for problems which were detected prior to estimation. A cursory look into Table 5.11 shows that it presents the results for the LISSA DTMFIs which are the baseline results and the results for the Non-LISSA DTMFIs which are a robustness check. In both sets of results, the regression output comes from two models, one for the depth of outreach, where the average deposit balance/GNI per capita (AVDGNI) was the dependent variable and the other for breadth of outreach, where the logarithm of the number of depositors (lnNODEP) was the dependent variable. The lagged dependent variables in Columns (1) to (4) are positive, significant and less than one at 10 % significance level except in Column 2 where the significance level is 1 %. This shows that the estimated system generalised method of moments' models are consistent with dynamic stability. The positive and significant lagged dependent variables indicate that the DTMFIs are persistent in increasing outreach depth and breadth through deposits. This means that their past deposits outreach programs have a positive bearing on their current and future ones. In other words, DTMFIs that deepen and broaden their current levels of outreach will continue intensifying them in the future. This is explained by the policies imposed by the national governments to catalyse financial access by the poor and marginalised populations through microfinance provision. However, Muriu (2011) argued that DTMFIs should be cautious that, persistence in increasing financial access is successful and profitable only if the outreach programs are cost efficient.

i. Results for the LISSA DTMFIs (Baseline Results)

Column (1) of Table 5.10 presents the baseline results the depth of outreach model. No significant relationship was found between financial sustainability and the average deposit balance per depositor/GNI per capita. This result is consistent with the findings of Mersland and Strøm (2010) as well as Bassem (2012). This entails that the self-sufficiency of the LISSA DTMFIs does not have any bearing on the deposit size scaled by the GNI per capita. The implication is that the LISSA DTMFIs can accept deposits of any size from any depositors regardless of their poverty status. This finding therefore, supports the Welfarists' theory as the pro-poor clientele who lodge small average deposit balances will not be left out by the LISSA DTMFIs. Thus, it can be said that no trade-off exists and mission drift has not occurred in the depository microfinance sector of the LISSA countries. Similarly, Mersland and Strøm (2010), Zerani and Rani (2011) and Martínez (2015) did not find existence of mission drift and trade-off on the microcredit lending side. According to Abdulai and Tewari (2017a), such results are

indicative of the fact that the outreach of the microfinance providers is not driven by their level of self-sufficiency. Thus, both outreach and financial sustainability can be pursued concurrently without the depth of outreach goal straining the quest for attaining operational self-sufficiency.

Contrary to the findings of this study, Hermes *et al.* (2011), as well as Xu *et al.* (2016), found the existence of mission drift and the trade-off between financial performance and outreach depth on the microlending front. Nonetheless, de Sousa-Shields and King (2005) argued that deepening outreach through mobilising small average deposit balances is done at the expense of achieving financial sustainability because administering many small deposit sizes is costly and erodes the operating income thereby stifling financial sustainability. Any deviation from small average balances reflects a change in the market segment served and improves financial sustainability; therefore, a focus towards the better-off poor who deposit large amounts is profitable (Armendariz and Szafarz, 2011). Therefore, this may suggest that the LISSA DTMFIs ought to focus on both the pro-poor and the well-off poor as well so that profits earned from serving the well-off poor can subsidise the losses on serving the pro-poor (Robinson, 2004). However, the LISSA DTMFIs may work with different segments of the market as they also provide credit as well. The LISSA DTMFIs can have different policies in terms of credit which may restrain access to credit by the poorest segments as they are less profitable and riskier or there may be interest rate caps in place. Under such circumstances, there might be signs of mission drift in the access to credit as found by Hermes *et al.* (2011) and Xu *et al.* (2016). However, Dokulilova *et al.* (2009, p. 2) argued that "the poor are viable customers as long as their financing is appointed in the right way" implying that mission drift may be absent for both deposits and microcredit if the LISSA DTMFIs are efficient in the financial intermediation process.

The deposits to total assets variable was positive and significant at the 5 % level of significance indicating that the LISSA DTMFIs are effective in the mobilisation of intermediated deposits from their market segments. The number of depositors per staff member variable was negative and significant with the average deposit size/GNI per capita at the 1 % level of significance giving the impression that administering small-scale deposit balances reduces the productivity of the personnel handling them. Similar to the study of Johnson (2015) this study did not find any significant relationship between age and outreach depth but Hermes *et al.* (2011) found that ageing reduces the efficiency of MFIs in their outreach programs. The insignificant relationship between the percentage of women clientele and outreach depth is

further evidence that no mission drift has occurred in reaching out to the LISSA residents through small average deposit balances. Reichert (2018) also reported that focusing on women clientele does not exhibit trade-offs. El-Maksoud (2016) also did not find evidence of mission drift occurring as a result of increased focus on women by the MENA MFIs.

The coefficient of size measured by logarithm of total assets was insignificant in explaining outreach depth of the LISSA DTMFIs. However, Wijesiri *et al.* (2015) found that size significantly influences the decisions of mature MFIs in achieving outreach and financial sustainability. In line with the findings of Xu *et al.* (2016), this study did not find a significant relationship between risk and portfolio quality and outreach depth. This confirmed the findings of Reichert (2018) that risk as measured by portfolio at risk results in fewer microfinance trade-offs.

The effect of the macroeconomic variables, commercial bank branches and the percentage of rural population on outreach depth is positive and significant at 10 % and 1 % levels of significance, respectively. The coefficient of the commercial bank branches may indicate that competition posed by commercial banks encourages the DTMFIs to re-strategise their deposit-taking programs to further deepen their outreach as they try to fight-off their rivals. Cull and Morduch (2017) argued that the pressure from commercial banks makes microfinance providers of various types to alter their methodologies in pursuing their outreach mission. The coefficient of the rural population percentage suggests that the deposit-taking programs of the LISSA DTMFIs are in line with the financial inclusion agenda of expanding financial access to the rural and marginalised areas. Contrary to the findings of this study, Xu *et al.* (2016) found no significant relationship between rural population and outreach depth.

The coefficients of the sub-regional dummies (Central Africa and Western Africa) are positive and significantly related to outreach depth at the 1 % level of significance. This gives the impression that the sub-regional differences positively influence the size of the deposits accepted by the LISSA DTMFIs. This finding concurs with Sainz-Fernandez, Torre-Olmo and López-Gutiérrez (2015) who noticed that regional differences influence the size of micro-financial services delivered by MFIs. Eastern Africa was the default category in both outreach depth and breadth models. No DTMFIs were sampled from Southern Africa as this sub-region has no low-income countries based on the classification of countries reported in the 2018 UNCTAD Handbook of Statistics.

Column (2) of Table 5.11 presents the baseline results for the outreach breadth model. Financial sustainability is negative and significant at the 5 % level of significance with the outreach breadth indicator, the logarithm of the number of depositors. This result is in marked contrast to the outreach depth model results where financial sustainability was insignificant with the average deposit size. Thus, a percentage decrease in financial sustainability stifles the growth rate in the number of depositors that the LISSA DTMFIs can reach by 0.28 % thereby contradicting the Institutionalists' theory. Therefore, a trade-off exists in achieving outreach breadth and financial sustainability in the LISSA's depository microfinance sector. Related findings were reported on the microlending side by Nyamsogoro (2010), Kipesha and Zhang (2013) as well as Amin *et al.* (2017) who found that outreach breadth as measured by the number of borrowers has a negative and significant relationship with financial sustainability. However, the findings of this study did not support those of Zerai and Rani (2011) who found a positive relationship between financial sustainability and outreach breadth proxied by the number of borrowers. Similarly, Lam *et al.* (2019) also found that financial performance contributes positively to social performance for profit-oriented MFIs.

The trade-off between outreach breadth and financial sustainability of the LISSA DTMFIs may be attributed to decreasing returns to scale that for every increase in the number of depositors, the profit from the trading activities is reduced by the costs of dealing with those depositors. Thus, inefficiency in dealing with increasing numbers of depositors in the name of financial inclusion in depository microfinance strains financial sustainability (Tehulu, 2013). Inefficiency as a result of the use of deposit mobilisation strategies such as extensive branch networks is embedded with exorbitant costs which have negative repercussions on attaining financial sustainability. Therefore, based on the findings of Ngo, Mullineux and Ly (2014), it means that there should be an optimal scale of the number of depositors that enable the LISSA DTMFIs to achieve their social and financial performance goals simultaneously. The trade-off between outreach breadth and financial sustainability of the LISSA DTMFIs may also imply that these institutions are not using in the best way, the funds available through deposits and, hence, are not maximising income generation of these funds through the provision of microcredits or deposits in other financial institutions.

Unlike the outreach depth model results, the outreach breadth model results present a positive but insignificant relationship between deposits to total assets and the number of voluntary depositors. While the number of depositors per staff member variable was negative and significant in outreach depth, the outreach breadth model presents a positive and significant

relationship between the depositors per staff member and the breadth of outreach at the 5 % level of significance. This finding is consistent with Abdulai and Tewari (2017b) who found that highly productive loan officers contribute positively towards increased outreach breadth. This gives the impression that the personnel handling depositors' accounts in the LISSA region are very productive in serving a significant number of depositors but their productivity is slowed down when the deposit size is small.

Unlike the outreach depth results, the coefficient of size is positive and significant with outreach breadth at the 10 % level of significance. This result is supported by findings of Wijesiri *et al.* (2015) who discovered that size significantly influences the outreach and financial performance of MFIs. In addition, the study of El-Maksoud (2016) also found that size is positive and significant with both outreach depth and outreach breadth. This shows that the LISSA DTMFIs leverage on their assets to tap as many depositors as possible. The descriptive statistics in Table 5.1 indicated that most of the LISSA DTMFIs are mature institutions that are most likely to have acquired tangible assets over the years. For these large and mature DTMFIs, experience and intangible assets such as goodwill also catalyse the process of reaching out to vast numbers of depositors. Differentiating deposit products is another contributing factor that comes along with leveraging on the assets held by the DTMFIs in expanding their breadth of outreach to vast numbers of depositors.

Similar to the outreach depth model results, no significant results are found for some DTMFI specific variables; age, percentage of women clientele and portfolio at risk. The macroeconomic controls are also insignificant in explaining outreach breadth contrary to the outreach depth results. Tran (2017) also found no significant influence of country-specific macroeconomic controls on the performance of MFIs. On the contrary, Ahlin *et al.* (2011) found out that country-specific macroeconomic controls have a bearing on their outreach activities. Therefore, this means that the influence of the macroeconomic variables on the social performance of microfinance providers varies across different locations.

The coefficients of the sub-regional dummies of Central Africa and Western Africa were both negative and significant at 10 % level of significance. This finding is not consistent with the findings on the outreach depth model where the coefficients of the sub-regional dummies are positive. As shown in Figure 5.2, the number of depositors from Western Africa LISSA DTMFIs rose steadily on an annual basis between the years 2006 and 2013 but rose sharply after the year 2014. The negative coefficient between the number of depositors and the

Western Africa sub-regional dummy may, therefore, indicate that the DTMFIs from this sub-region are not coping well with the very sharp increases of the number of depositors since the year 2014. The negative coefficients may, therefore, indicate that the DTMFIs from Central Africa and Western Africa are not coping well with sharp increases in the number of depositors.

ii. Results for the Non-LISSA DTMFIs (Robustness Check)

As a comparison and to make the baseline results robust, the study also estimated the depth and breadth of outreach models for 36 Non-LISSA DTMFIs sampled across 6 countries. In the robustness check models (Columns (3) and (4) of Table 5.11), the lagged dependent variables for both outreach depth and breadth are positive and significant at the 1 % level of significance. This finding is consistent with the baseline results indicating that the Non-LISSA DTFMIs are also persistent in their deposit-taking programs.

In line with the baseline outreach depth results, the robustness check results in Column (3) show no significant relationship between financial sustainability and the average deposit size indicating that neither a trade-off nor a mission drift has occurred in the depository microfinance sector of the Non-LISSA countries. The results of the other explanatory variables largely concur with those found in the baseline models except for deposits to total assets, depositors per staff member, competition, location and the sub-regional dummies. The Western Africa dummy is negative and significant with outreach depth at the 10% level of significance contrary to the baseline results. The Eastern Africa dummy is positive and significant with outreach depth at the 10 % level of significance in line with the sub-regional dummies in the baseline outreach depth model. Southern Africa is the default category in both outreach depth and breadth models.

In line with the breadth of outreach model for the LISSA DTMFIs, both models for the Non-LISSA DTMFIs have positive and significant coefficients for size with financial sustainability. This reflects that the Non-LISSA DTMFIs are effective in using their assets to reach the poorest depositors in their vast numbers. Similar to the results of the LISSA DTMFIs, some DTMFI specific variables were not significant in both models; AGE, POW, DEPSTAME and PAR. The country-specific macroeconomic variables were also insignificant in both models.

In the outreach breadth results, the robustness check results in Column (4) are not in line with the baseline results as financial sustainability is insignificant in explaining the number

of depositors. This indicates that there is no trade-off in outreach breadth amongst the Non-LISSA DTMFIs. The results of most of the explanatory variables largely concur with those of the baseline outreach results except for the productivity variables and the Western and Eastern African sub-regional dummies. The negative and significant relationship at the 5 % level of significance between the sub-regional dummies (Central Africa and Eastern Africa) and the log of number of depositors suggests that locational factors have the potential to inhibit the deposit mobilisation strategies of the Non-LISSA DTMFIs. Such locational factors may include the existence of informal, widely dispersed and inaccessible settlements which constrain the ability of these DTMFIs to reach out to as many depositors as possible.

5.5 Conclusion

This chapter focussed on the presentation and discussion of the research findings which were obtained using three econometric methods in addressing the three objectives of the study.

Form the results obtained through probit regression, this chapter concludes that the scale of deposit operations spurs financial sustainability when it consists of large-scale deposits only. Relying on this scale of deposit operations, the permanence of the LISSA DTMFIs as tools for fighting extreme poverty and in increasing financial access is guaranteed. However, the likelihood of attaining financial sustainability in the depository microfinance sector of the LISSA countries is pulled down by operations consisting of small-scale deposits only, high operating expenses, unfavourable loan loss provisioning, deteriorating loan portfolio quality and costly wide coverage. These factors, therefore, reduce the life span of the LISSA DTMFIs in serving their niche market. Unexpectedly, the BANKs which are counted as experienced in deposit mobilisation are not bailed out by their ageing experience in the financial sustainability drive. The financial expenses ratio, the size of the DTMFIs, regulatory quality and the remainder of the charter types (CUCs and NBFIs) were not found to be significant in accounting for the probability of the LISSA DTMFIs' financial sustainability.

The results of the random effects panel methodology pointed out that deposit insurance schemes help to boost the liquidity positions of the LISSA DTMFIs in repaying depositors' funds, meeting loan requests and other operational costs. It was also discovered that having and maintaining the capital adequacy ratio above the stipulated thresholds and in line with the Basel recommendations positively influence liquidity in depository microfinance. Thus, deposit protection through deposit insurance, prudential regulation and Basel guidelines on capital adequacy, is crucial in influencing the cash inflows, cash outflows and cash reserves of

deposit-taking institutions in the microfinance sector. However, the size of the DTMFIs when measured using the gross loan portfolio was found to be a negative determinant of liquidity. The financing, loan loss rates, interest income of the LISSA DTMFIs were found to have no significant influence on liquidity. The price level as captured by the consumer price index was also found to have no significant influence on the liquidity of the LISSA DTMFIs.

Through the System Generalised Method of Moments, this chapter found that there is no significant relationship between the depth of outreach and financial sustainability of the LISSA DTMFIs thereby suppressing the mission drift argument. Thus, both outreach and financial sustainability can be pursued concurrently without the depth of outreach goal straining the quest for operational self-sufficiency as no trade-off exists. However, a negative and significant relationship between the breadth of outreach and financial sustainability of LISSA DTMFIs was found, depicting that a trade-off exists in pursuing these two dual goals in microfinance provision concurrently. Pursuing one of the goals harms the other. From the significance of the deposits to assets ratio in the outreach depth model, it was concluded that the LISSA DTMFIs are active in balancing the needs of surplus and deficit units in microfinance provision. However, this is done at the expense of the productivity of the personnel that handles the deposits as outreach is deepened. In marked contrast, the deposit-taking staff members are productive as outreach is broadened. Further conclusions are that the country-specific controls and sub-regional factors positively influence the outreach depth. However, in outreach breadth, the number of depositors is not affected by the macroeconomic factors but is stifled by sub-regional influence especially in Central and Western Africa.

The overall conclusion of this chapter is that the current efforts for eradicating extreme poverty through microfinance provision in the LISSA countries as stipulated in the SDGs are possible only if the LISSA DTMFIs are financially sustainable, operate with adequate levels of liquidity and reach out to the vast numbers of the poor in their different degrees of poverty profitably.

The next chapter highlights the summary of the main conclusions of the whole study, its contributions, the recommendations to different microfinance stakeholders, and lastly, the areas for future research.

CHAPTER SIX:
CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This final chapter provides a summary of the main findings of the study that were presented and discussed in Chapter five. The contributions of the present study to the body of existing microfinance literature are then given next; followed by the recommendations of the study to different microfinance stakeholders to aid their decision-making processes and inform policy formulation. Lastly, the limitations of the study and the areas for further study are highlighted.

6.2 Summary of the main findings of the overall study

This thesis analysed the financial and social performance of 64 DTMFIs that were sampled from 18 countries across Low Income Sub-Saharan Africa. An unbalanced panel dataset which spanned the period, 2006 to 2017 was utilised. The data for the DTMFI specific variables were obtained from the MIX, an online database of self-reporting MFIs from different countries across the globe. The data for the macroeconomic variables were obtained from three sources; World Governance Indicators, World Development Indicators and the deposit insurance database. The performance of the LISSA DTMFIs was analysed using three measures; financial sustainability, a gauge for long-term financial performance; liquidity, a barometer for short-term financial performance; and outreach, an indicator for social performance. This study assumed that successful DTMFIs that perform satisfactorily both in the short-term and long-term, guarantee their continued social performance in the form of outreach breadth and depth in the persistent fight against extreme poverty and financial exclusion in the LISSA countries.

The findings of the study which were presented and discussed in Chapter five are summarised in sub-sections 6.2.1 to 6.2.3

6.2.1 Findings on Deposits and Financial Sustainability – A Brief Summary

The first objective of the study sought to understand why the LISSA DTMFIs fail to achieve financial sustainability despite having commendable deposit volumes as shown by statistics from the MIX's annual reports. The common ground in empirical literature is that

deposits spur financial sustainability as they do not erode operating income since the interest amount that is paid on deposits is very low when compared to the interest amount payable to other sources of financing operations and the loan book (Brom, 2009; Dokulilova *et al.*, 2009; Ek, 2011; Hulme and Aran, 2011; Millson, 2013; Kaloo, 2015; Bayai and Ikhide, 2016a). However, this is not the case in some of the LISSA countries as there has been cases of DTMFIs crumbling and folding (Riquet and Poursat, 2013; Boateng *et al.*, 2016). Against this background and given the need to build sound, sustainable and inclusive depository microfinance systems that have lasting effects in alleviating poverty, this study regressed scales of deposit volumes against the financial sustainability measure, operational self-sufficiency, using the probit regression technique. The results were interpreted using the signs and magnitude of the average marginal effects.

The results showed that small-scale deposit operations militate against the likelihood of attaining financial sustainability due to negative returns to scale that are associated with mobilising small-scale deposits. This shows that small-scale deposit operations are choked by the regulatory compliance costs and operational costs of mobilising deposits and these costs hold back attainment of financial sustainability. Moreover, small-scale deposits are mostly transitory deposits or demand deposits that are called up at any time suggesting that they are volatile deposits. This means that this scale of deposits is not always readily available for financing the operations and the loan portfolio indicating that less interest income is generated for boosting financial sustainability. Thus, small-scale deposits largely account for the reason why the LISSA DTMFIs do not attain financial sustainability as envisioned. Nonetheless, positive returns to scale were linked to large-scale deposit operations as they were found to upsurge financial sustainability. This is confirmed by the work of Ngo *et al.* (2014) who found that MFIs that increase their scale of lending operations are financially sustainable. Thus, the large-scale deposits are most likely to be time or term deposits which are held up to maturity hence they are stable deposits that can be intermediated into loans which generate interest income that boosts financial sustainability.

Failure to attain financial sustainability by the LISSA DTMFIs was also linked to some DTMFI specifics; high operating expenses ratio, unfavourable adjustments for loan loss provisions, high number of branches and high loan portfolios at risk. The inference is that inefficiency in managing these DTMFIs features in the ordinary course of the normal trading activities is inversely related to attaining financial sustainability.

As Abdulai and Tewari (2016) noted, efficiency in running microfinance businesses is a prerequisite for attaining financial sustainability. Inspite of being experienced in deposit mobilisation, the coefficient of the bank charter type was also found to be negatively related to financial sustainability indicating that cost inefficiency cripples this deposit-taking modality. The study also found that the yield on the gross loan portfolio improve the likelihood of the LISSA DTMFIs' financial sustainability. The remainder of the DTMFI specific variables; age, the logarithm of total assets, and the financial expenses ratio, were insignificant in explaining the likelihood of financial sustainability of the LISSA DTMFIs. Based on the logit robustness check results, failure to attain financial sustainability in the depository microfinance sector of the LISSA countries is attributed to the country's macroeconomic variable, a regulatory quality which is largely poor in most of the LISSA countries. The average marginal effects for this variable were significant. The baseline results and the robustness check results were largely congruent with only slight variations in magnitude of the coefficients.

6.2.2 Findings on Liquidity and Deposit Insurance -A Brief Summary

The second set of results was based on the second objective of the study which linked liquidity and deposit insurance through the random effects panel framework. This objective was motivated by two notable trends in the depository microfinance sector of the low-income countries in SSA. Firstly, the fact that microfinance depositors are the victims of liquidity risk as the DTMFIs default in repaying their deposits during withdrawal periods, wholly or timeously (Riquet and Poursat, 2013; Boateng *et al.*, 2016). Secondly, only a limited number of LISSA countries have designed and implemented deposit insurance schemes which safeguard against defaulting DTMFIs (Demirgüç-Kunt *et al.*, 2015; Mecagni *et al.*, 2015; IMF, 2016a).

The logarithm of the non-earning liquid assets to total assets ratio was the proxy for liquidity and deposit insurance was captured as a dummy variable. A positive and significant relationship was found between liquidity and deposit insurance indicating that adopting deposit insurance schemes that embrace microfinance deposits improves the liquidity situation in the depository microfinance sector of the LISSA countries. In addition, adhering to prudential regulation standards through maintaining good capital adequacy standards as prescribed by the Basel Committee has a positive bearing on the liquidity of LISSA DTMFIs (BCBS, 2010). Thus, microfinance deposits and operating with prescribed capital adequacy levels is a hedge against liquidity risk and a depositor confidence booster in depository microfinance. Thus,

deposit protection augments the financial inclusion of small and poor savers from the low-income countries of Sub-Saharan Africa as it provides a safety net for their microdeposits. Size, as captured by the logarithm of the gross loan portfolio, constrains maintaining adequate liquidity levels. The blame can be put on deteriorating loan portfolio quality as the portfolio at risk ratio in the LISSA countries exceeds the internationally tolerable levels. No significant relationships were established between liquidity and the logarithms of the financing variable (deposits to loans), the risk variable (loan loss rate), the revenue variable (yield on the gross loan portfolio) and the country-specific variable (inflation rate as measured by the consumer price index). The robustness check Generalised Least Squares method results corroborated the baseline random effects regression results.

6.2.3 Findings on Outreach and Financial Sustainability – A Brief Summary

The third objective of the study investigated the relationship between financial sustainability and outreach depth and breadth using deposit-taking social performance measures to ascertain whether a trade-off exists or mission drift has occurred in depository microfinance. Given the commendable number of depositors that exceed the number of borrowers in the provision of microfinance products and services in SSA, the need to examine the outreach-financial sustainability relationship in the context of depository microfinance was inevitable. Empirical evidence has only explained the relationship from a lending perspective. The System Generalised Method of Moments was employed. Results were categorised into two groups. The baseline results were based on the fixed panel of 64 DTMFIs drawn across 18 LISSA countries. The robustness check results were based on a sample of 36 DTMFIs drawn across 6 Non-LISSA countries.

The lagged dependent variables in the baseline results for both outreach depth and breadth models were positive and significant indicating that the LISSA DTMFIs are persistent inclusive financial systems in outreach depth and breadth. This means that their past deposits outreach programs have a bearing on their current and future ones. The depth of the outreach model found no significant relationship between financial sustainability and the average deposit balance/GNI per capita implying that the deposit size scaled by the GNI per capita does not have any bearing on self-sufficiency. Thus, neither a trade-off exists nor mission drift has occurred in outreach depth in the depository microfinance sector of the LISSA countries. The deposits to total assets variable was found to be positive and significant with outreach depth indicating that the LISSA DTMFIs are effective in the mobilisation of intermediated deposits.

The depositors per staff member coefficient was negative and significant with outreach depth giving the impression that the productivity of staff members in dealing with depositors is stifled by handling small average deposit balances. No significant relations were found between outreach depth and the number of years of operation, percentage of women borrowers, logarithm of total assets, and portfolio at risk. The country-specific controls, commercial bank branches and the percentage of rural population clientele, and the sub-regional factors positively influence outreach depth.

Outreach breadth proxied using the logarithm of the number of depositors was negative and significant with financial sustainability. Thus, financial sustainability is reduced as the number of depositors increases. Therefore, a trade-off exists in outreach breadth in the pursuit of the double bottom-line objectives. Contrary to the outreach depth model results, no significant relationship was found between the deposits to total assets and outreach breadth. Unlike the depth of outreach model, productivity of staff members was positive and significant with outreach breadth giving the impression that the personnel handling depositors' accounts in the LISSA region are very productive in serving a significant number of depositors but their productivity is slowed down when the deposit size is small. The coefficient of size was positive and significant with the log of the number of depositors indicating that the LISSA DTMFIs leverage on the goodwill they generate through their infrastructural development and extensive branch networks in tapping many depositors. Congruent with the outreach depth model, no significant results were found for the number of years of operation, percentage of women clientele and risk and loan portfolio quality. Moreover, the study found that outreach breadth is not affected by the macroeconomic factors but is stifled by sub-regional influences.

On robustness checks, no significant relationships were found between financial sustainability and outreach depth or breadth. Thus, both results suggest that there is no existence of a trade-off or presence of a mission drift amongst Non-LISSA DTMFIs. On the contrary, the baseline results only found insignificant relations in the depth of outreach model and significantly negative relations in the breadth of the outreach model.

6.3 Originality and contribution of the present study

To best of the researcher's knowledge, this study is original as none of the previous regional microfinance studies in Sub-Saharan Africa have:

i. looked at the performance of DTMFIs that are solely drawn from the Low-Income Countries. The World Development Indicators of the World Bank show that Sub-Saharan Africa as a whole is the world's poorest region and poverty is more extreme amongst its Low-Income Countries than in the Low Middle-Income Countries, Upper Middle-Income Countries and the High-Income Countries. Hence, this study assumed that microfinance provision is greatly needed in the Low-Income Countries of SSA as a developmental tool for fighting extreme poverty by increasing financial access through providing formal and safe deposit facilities for the savings of the poor and the low-income households. In turn, the DTMFIs intermediate the mobilised deposits into loans thereby increasing financial access through microcredit as well.

ii. delved into why the DTMFIs of the LISSA countries fall short in attaining financial sustainability when they can leverage on their huge and commendable deposit volumes to finance their operations and the loan book. Furthermore, the previous studies have not used a different proxy for deposit mobilisation besides the deposits to assets in analysing the relationship between deposits and financial sustainability. In marked contrast, this study proxied deposited mobilisation using scales of deposits.

iii. examined the relationship between the liquidity of the DTMFIs and explicit deposit insurance, a means of protecting the deposits lodged by the poor and the low-income households when the DTMFIs fail to honor their withdrawals.

iv. have explained the outreach-financial sustainability relationship in the context of deposit-taking outreach variables.

This study contributes to the existing body of literature as explained in sub-sections 6.3.1 to 6.3.3.

6.3.1 Theoretical Contributions

The theoretical contributions of this study are based on the strength of the applied theories in explaining the interrelationships and determinants of the main variables of this study which were financial sustainability, liquidity and outreach. Thus, the study did not contribute something new to the applied theories, but there was an appreciation of the applicability of the theories in explaining the objectives and findings of the study. Adopting the theory of financial intermediation of deposits and the Institutionalists' theory of financial sustainability in the first objective of the study enabled the study to find and explain the root causes of the failure of the

LISSA DTMFIs in attaining full financial sustainability. In applying the provision of liquidity arm of the theory of financial intermediation of deposits and the deposit insurance theory in second objective of the study, the study established that explicit deposit insurance schemes are inevitable in improving liquidity and safeguarding deposits in the depository microfinance sector of the LISSA countries. The study found complementarity and substitutability between the Welfarists' theory (outreach approach) and Institutionalists' theory (financial sustainability approach) in explaining the third objective which looked at the outreach-financial sustainability nexus. Complementarity of the theories was explained by the absence of mission drift and trade-off in outreach depth while substitutability of the theories was explained by the existence of a trade-off in outreach breadth.

6.3.2 Methodological Contributions

To the best of the researcher's knowledge, the methodological contributions of the present study are that, it adopted certain variables in the estimation process which had not been used in other studies in explaining the interrelationships and determinants of the main variables under study. In the first objective, adopting the scales of deposits dummies as the proxy for deposit mobilisation in explaining financial sustainability was distinct from the previous studies which relied on the deposits to assets and deposits to loans ratios as indicators of deposit mobilisation. In the second objective of the study on liquidity and deposit insurance, adopting the deposit insurance variable in explaining liquidity is not common in microfinance literature. In the third objective of the study, making use of deposit-taking outreach variables in linking outreach depth and breadth to financial sustainability distinguished the current study from the prior ones which mainly focussed on micro-lending outreach variables in capturing outreach depth and breadth.

6.3.3 Practical and Policy Contributions

The practical and policy contributions of the study are explained below.

i. The study has established that the failure of DTMFIs in the LISSA countries to attain financial sustainability is directly linked to the scales of operation of their deposit volumes (specifically the small-scale deposits) and institutional factors (inefficient operations, impairment of losses, poor loan portfolio quality, a wide branch network and the bank charter type). However, large-scale deposit operations spur the likelihood of attaining financial sustainability.

ii. The study has shown that deposit insurance is a positive determinant of liquidity of DTMFIs in the LISSA countries. Additionally, the study also found that adherence to the capital adequacy standards of the Basel framework compliments deposit insurance schemes in ensuring that the LISSA DTMFIs are hedged against liquidity risk thereby boosting the confidence of the depositors in making withdrawals.

iii. The study also filled the literature gap on the outreach-financial sustainability relationship explained from a depository microfinance perspective and concluded that in depository microfinance, there is neither a trade-off nor mission drift in outreach depth but a trade-off exists in outreach breadth based on deposit-taking outreach variables.

6.4 Recommendations

Following the commendable growth in the deposit volumes and the number of depositors in the depository microfinance sector of SSA which was not matched by pleasing short-term and long-term financial performance, this study examined the sector's financial sustainability, liquidity and outreach. The findings showed that in the LISSA countries' depository microfinance sector: (1) financial sustainability is still a problem and is linked to small-scale deposit mobilisation and inefficiency in managing operational and non-operational costs; (2) adoption of deposit insurance schemes reduces liquidity risk and; (3) neither a trade-off exists nor mission drift has occurred in outreach depth but a trade-off exists in outreach breadth. Based on these findings, this section provides recommendations for policy formulation and for the running of financial sustainable, liquid and outreach-conscious DTMFIs.

Recommendation 1: Promoting financial sustainable and cost-efficient large-scale deposit mobilisation programs

To improve on financial sustainability, it is recommended that instead of spreading wings through extensive branch networks which are a costly exercise, the LISSA DTMFIs can leverage on agent banking and the advances in mobile phone technologies for increasing financial access thereby increasing the chances of tapping large deposit volumes from their existing and potential niche markets. Through the use of agents and the mobile phone in financial services provision, existing and potential depositors are enabled to save on transport costs, and these savings on transport expenses are most likely to be added to the initial deposits.

This increases the average deposit balances from small-scale to large-scale without any implications for mission drift. Moreover, the previously unbanked small-scale communal farmers and the entrepreneurial poor who will now have easy access to formal savings facilities are most likely to deposit their earnings in large amounts. With large scales of deposits, the LISSA DTMFIs can benefit from economies of scale which result in cost savings. However, the deposit mobilisation programs have to be cost efficient if they are to be sustainable. Therefore, the LISSA DTMFIs should be cautious that increased focus on large scale deposits leads to mission drift, hence there is need to balance the quest for financial sustainability with outreach goals. Furthermore, leveraging on agent banking and mobile phone technologies also enables the LISSA DTMFIs to balance the number of operational DTMFIs' offices or branches and the high numbers of depositors that they serve. This helps the DTMFIs to save on the required huge initial capital outlays which are usually embedded with recurrent expenditures such as rental payments and staff salaries for maintaining these outreach outlets. In doing this, the operational expenses ratio can be reduced to efficient, profitable and sustainable levels.

Loan portfolio quality has to be improved in the LISSA's depository microfinance sector as the average portfolio at risk of 6.87 % is above the international benchmark of 5 %, thereby eroding operating profits which reduces the likelihood of attaining financial sustainability. Rescue packages should therefore incorporate effective pre and post disbursement checks which, inter alia, include; operationalisation of collateral registries and increasing the proliferation of credit reference bureaus so as to help minimise the chances of recording high portfolio at risk ratios, default risk and making upward adjustments for loan loss provisions as business cycles change (Hessou *et al*., 2019).

Regulatory quality ought to improve amongst the LISSA countries by giving the regulators sufficient resources and discretion to act on the basis of business consideration. This also entails that the regulators ought to guard against extensive licencing of small, incapacitated, undercapitalised and inexperienced COMFIs into DTMFIs under the banner of promoting financial inclusion of the vast poor and marginalised low-income households through deposit products and other micro-financial services.

Recommendation 2: Designing and implementing explicit deposit insurance schemes that embrace depository microfinance to minimise liquidity risk

Since the study concluded there is a positive and significant relationship between liquidity and deposit insurance, the LISSA regulators ought to design and implement explicit

deposit insurance schemes that safeguard against liquidity risk, runs on deposits and systemic risk. On 26 July 2019, the Reserve Bank of Zimbabwe placed Lion Microfinance Bank under curatorship due to viability and corporate governance concerns. The Deposit Protection Corporation of Zimbabwe was appointed as the curator so as to safeguard depositors' funds and to maintain financial stability. Explicit deposit insurance schemes are highly recommended especially in the depository microfinance sector in the WAEMU region where they have not been implemented at all and this is where most of the depositors have lost their savings to DTMFIs. According to the reputable works of Demirgüç-Kunt *et al.* (2005; 2015), explicit deposit insurance schemes should state; the types of institutions (commercial banks and other deposit-taking financial institutions-the DTMFIs), the extent and amount of coverage, the types of deposits (local currency deposits, nostro accounts, vostro accounts, interbank deposits, foreign currency deposits) and how the explicit deposit insurance pools are to be funded.

Since deposit insurance schemes ignite the danger of moral hazard either from the excessive risk-taking behaviour of the banks on asset side or the reluctant behaviour of the depositors on the liability side of the DTMFIs' balance sheets, proactive measures have to be taken to minimise this unwanted deterrent. Supervisors have to educate the depositors through the Core Client Protection Principles to protect themselves and to be guided on how the depositors hold or move their savings within the insured DTMFIs. Furthermore, supervisors of DTMFIs have to strike a balance between stifling business innovations and investment gains through restricting certain activities and transactions of the insured DTMFIs and allowing the DTMFIs to seize opportunities that yield high returns on investments using the insured depositors' funds based on tolerable levels.

Explicit deposit insurance packages have to be reinforced by adherence to the 2010 Basel Committee's recommendations or principles for supervising non-mainstream banking financial institutions that tap deposits. These include Principle 6 that covers capital adequacy standards and Principle 14 that highlights the importance of liquidity risk management strategies and contingency plans. Active liquidity management practices such as asset and liability management are also encouraged to be proactive in the LISSA's depository microfinance sector.

Recommendation 3: Differentiated or diversified marketing and retailing of deposit products and increased focus on cost-efficient outreach deposit-taking operations

Since the study concluded that neither a trade-off exists nor mission drift has occurred in outreach depth, it implies that the LISSA DTMFIs can tap savings from any surplus units regardless of their poverty status. This entails that the deposit portfolios can comprise both small and large average deposit balances. It is therefore recommended that the LISSA DTMFIs segment their markets and develop deposit products that are appropriate for each market segment so that the requirements of the different types of depositors are met more precisely and fully. This will intensify deposit inflows from all the market segments thereby suppressing the chances of mission drift. The chances of attaining financial sustainability will be increased as the efficiency gains earned from profitable market segment can be leveraged on to offset the loss-making ones.

Furthermore, as the study concluded that a trade-off exists in outreach breadth, it is recommended that the LISSA DTMFIs formulate cost cutting measures in their deposit-taking programs as the numbers of both the pro-poor and the better-off depositors increase. This will help boost financial sustainability. As mentioned above, the LISSA DTMFIs should leverage on cost-efficient deposit-taking methods such as hiring commission based mobile agents or adjunct stationed agents. The technological revolution on the use of the mobile phone in Kenya which has demonstrated that even the poorest individual can afford to possess a simple mobile phone is one of the plausible solutions. Therefore, mobile phone deposit-taking platforms should be adopted but they should be followed by reduction or subsidisation of mobile phone transaction costs. Also, the LISSA DTMFIs have to guard against free account opening as some of the accounts may be empty accounts in perpetuity; avoid promising to pay high interest rates on deposits which are unsustainable as they attempt to increase their market share; and not to have many clustered office networks as they are embedded with exorbitant costs which have undesirable repercussions on realising financial sustainability.

6.5 Study limitations and areas for further study

6.5.1 Limitations of the Study

The main limitation of the study stems from the principal data that were used in the study. Data were obtained from the MIX, a web-based platform that promotes information disclosure by MFIs globally. MIX reporting DTMFIs do so voluntarily thereby inducing self-

selection bias in the dataset used in this study since it is not obligatory for all the universal DTMFIs to report to the MIX. Voluntary reporting to the MIX also entails that the datasets extracted are not representative of the whole microfinance sector globally. Also, DTMFIs and COMFIs from SSA do not report consistently and periodically to the MIX. This is caused by their untimely entry and exit in the MIX database. Barnett (2011) blamed the numerous and varied external reporting formats and templates by MFIs from SSA to various microfinance stakeholders as the cause of the less contribution in the MIX database. Therefore, the MIX datasets are marred by missing values in some years thereby giving birth to unbalanced panels. As data quality was of prime importance in this study, most of the DTMFIs that could have been included in the sample were left out due to the incompleteness of their data. Furthermore, some LISSA countries that could have been included in the sample were left out because their MIX reporting DTMFIs had data which was of poor quality or some LISSA countries have no DTMFIs reporting to the MIX. Despite all these dataset limitations encountered in the study, it is imperative to note that the MIX datasets are the premier datasets on the financial and social performance of MFIs that are currently available. It is in this regard that numerous and reputable microfinance published works have relied on the MIX platform datasets over the years (Ahlin, Lin and Maio, 2011; Bogan, 2012; Quayes, 2012; Vanroose and D'Espailler, 2013; Janda and Zetek, 2014; Johnson, 2015; Bayai and Ikhide, 2016b; Abdulai and Tweari, 2017a, 2017b; Cull and Morduch, 2017; Hessou, Lensink, Soumare and Tchakoute-Tchuigoua, 2019; Tchakoute-Tchuigoua and Soumare, 2019).

6.5.2 Areas for further study

Four areas of further research are proposed by the present study:

Firstly, there is need to investigate whether the DTMFIs can diversify their financing options to include structured finance products in an attempt to improve financial sustainability. The current studies that have examined the capital structure or financing of MFIs have shown that MFIs have entered the capital markets since the initial public offering (IPO) of Banco Compartamos of Mexico in 2007 which marked a paradigm shift in the financing structure of MFIs. However, scanty literature exists on whether the MFIs have gone beyond the conventional financial markets to include re-engineered capital market instruments in the structured finance markets.

Secondly, there is need to investigate whether it is possible to establish an inter-microfinance market where the DTMFIs can borrow and lend each other in a bid to satisfy their

funding and liquidity needs using a typical benchmark interest rate; the microfinance agreed interest rate. Such a reference interest rate for the microfinance sector can replicate the calculation methodologies of the already existing ones that are used in the main banking stream; the Johannesburg Interbank Average Rate (JIBAR), the London Interbank Offered Rate (LIBOR) and the Euro Interbank Offered Rate (EURIBOR). Participation in the inter-microfinance market may also incorporate the big, financial sustainable and adequately capitalised COMFIs. Moreover, there is need for the LISSA regulators to assess if their DTMFIs can also be included as part of their Domestic, Systematically Important Banks (DSIBs) as their failure can also cause problems such as loss of depositor confidence.

Thirdly, there is need to deepen the knowledge on savings access and use, and its role on replacing or complementing microcredit and other micro-financial services in a bid to increase financial access to low income populations sustainably.

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APPENDICES

Appendix 1: List of Low-Income Sub-Saharan Africa (LISSA) Countries with (GNI per Capita of US$1 025 or less)

	LISSA Countries	CODE	Sub-region	Lending Category	Other
1	Benin	BEN	WA	IDA	HIPC
2	Burkina Faso	BFA	WA	IDA	HIPC
3	Burundi	BDI	EA	IDA	HIPC
4	Central African Republic	CAF	CA	IDA	HIPC
5	Chad	TCD	CA	IDA	HIPC
6	Comoros	COM	EA	IDA	HIPC
7	Congo, Democratic Republic	ZAR	CA	IDA	HIPC
8	Eritrea	ERI	EA	IDA	HIPC
9	Ethiopia	ETH	EA	IDA	HIPC
10	Gambia, The	GAM	WA	IDA	HIPC
11	Guinea	GNI	WA	IDA	HIPC
12	Guinea-Bissau	GNB	WA	IDA	HIPC
13	Liberia	LBR	WA	IDA	HIPC
14	Madagascar	MOZ	EA	IDA	HIPC
15	Malawi	MWI	EA	IDA	HIPC
16	Mali	MLI	WA	IDA	HIPC
17	Mozambique	MOZ	EA	IDA	HIPC
18	Niger	NER	WA	IDA	HIPC
19	Rwanda	RWA	EA	IDA	HIPC
20	Senegal	SEN	WA	IDA	HIPC
21	Sierra Leone	SLE	WA	IDA	HIPC
22	Somalia	SOM	EA	IDA	HIPC
23	South Sudan	SSD	EA	IDA	HIPC
24	Tanzania	TZA	EA	IDA	HIPC
25	Togo	TGO	WA	IDA	HIPC
26	Uganda	UGA	EA	IDA	HIPC
27	Zimbabwe	ZWE	EA	Blend	-

Key: CA - Central Africa, EA - Eastern Africa, SA - Southern Africa, WA - Western Africa, IDA - International Development Association and HIPC - Heavily Indebted Poor Country

Source: Author's compilation using the 2017 World Development Indicators, World Bank List of Economies as at June 2018 and the 2018 United Nations Conference on Trade and Development Handbook of Statistics.

Appendix 2: Implementation of the Basel Recommendations in Sub-Saharan Africa as of 2014

LISSA Countries	Basel II Implementation	Non-LISSA Countries	Basel II Implementation
Benin	Not yet	Angola	Not yet
Burkina Faso	Not yet	Botswana	In progress
Burundi	In progress	Cameroon	Not yet
Central African Republic	Not yet	Congo, Republic	Not yet
Chad	Not yet	Cape Verde	In progress
Comoros	In progress	Cote d'Ivoire	Not yet
Congo, Democratic Republic	Not yet	Equatorial Guinea	Not yet
Eritrea	N/A	Gabon	Not yet
Ethiopia	Not yet	Kenya	Parts of II & III
Gambia, The	Not yet	Lesotho	Not yet
Guinea	Not yet	Mauritius	Basel II
Guinea-Bissau	Not yet	Namibia	Parts of II
Liberia	In progress	Nigeria	In progress
Madagascar	Not yet	Sao Tome & Principe	In progress
Malawi	Basel II	South Africa	Basel III
Mali	Not yet	Sudan	N/A
Mozambique	Basel II	Swaziland	Not yet
Niger	Not yet	Zambia	Not yet
Rwanda	In progress	Zambia	Not yet
Senegal	Not yet		
Sierra Leone	Not yet		
Somalia	N/A		
South Sudan	Not yet		
Tanzania	Not yet		
Togo	Not yet		
Uganda	Not yet		
Zimbabwe	In progress		

Source: Adapted from International Monetary Fund (2016a, p. 60) and Mecagni *et al.* (2015, p. 28)

Appendix 3: Explicit Deposit Insurance in Sub-Saharan Africa

LISSA Countries	Explicit Deposit Insurance	Non-LISSA Countries	Explicit Deposit Insurance
Benin	No	Angola	No
Burkina Faso	No	Botswana	No
Burundi	No	Cameroon	Yes
Central African, Republic	Yes	Congo, Republic	Yes
Chad	Yes	Cape Verde	No
Comoros	No	Cote d'Ivoire	No
Congo, Democratic Republic	No	Equatorial Guinea	Yes
Eritrea	No	Gabon	Yes
Ethiopia	No	Kenya	Yes
Gambia, The	No	Lesotho	No
Guinea	No	Mauritius	No
Guinea-Bissau	No	Namibia	No
Liberia	No	Nigeria	Yes
Madagascar	No	Sao Tome & Principe	No
Malawi	No	South Africa	No
Mali	No	Sudan	No
Mozambique	No	Swaziland	No
Niger	No	Zambia	No
Rwanda	No		
Senegal	No		
Sierra Leone	No		
Somalia	No		
South Sudan	No		
Togo	No		
Tanzania	Yes		
Uganda	Yes		
Zimbabwe	Yes		

Source: Compiled by author based on Demirgüç-Kunt *et al.* (2015), International Monetary Fund (2016a) and Mecagni *et al.* (2015)

Appendix 4: Characteristics of the Sampled LISSA DTMFIs

	DTMFI	Country and Code	SSA Sub-regio	Charter Type	Age	Diamonds
1	ACFB	Benin (BJ)	West Africa	NGO	13	4
2	ALIDE	Benin (BJ)	West Africa	NGO	11	4
3	CMMB	Benin (BJ)	West Africa	CU/C	20	4
4	FECECAM	Benin (BJ)	West Africa	CU/C	20	3
5	PADME	Benin (BJ)	West Africa	NGO	24	3
6	PEBCO	Benin (BJ)	West Africa	NGO	21	4
7	VITAL FINANCE	Benin (BJ)	West Africa	NGO	19	4
8	GRAINE SARL	Burkina Faso (BF)	West Africa	NBFI	25	3
9	PAMF	Burkina Faso (BF)	West Africa	NBFI	12	3
10	CECAD	Burundi (BI)	East Africa	CU/C	10	3
11	CECM	Burundi (BI)	East Africa	CU/C	22	3
12	COSPEC	Burundi (BI)	East Africa	CU/C	16	3
13	DIFO SA	Burundi (BI)	East Africa	NBFI	7	4
14	DUKUZE	Burundi (BI)	East Africa	NBFI	7	3
15	FSTE	Burundi (BI)	East Africa	CUC	32	3
16	RECECA INKISI	Burundi (BI)	East Africa	NBFI	9	3
17	TURAME COMMUNITY FINANCE	Burundi (BI)	East Africa	NBFI	13	3
18	WISE	Burundi (BI)	East Africa	NBFI	10	3
19	UCEC/MK	Chad (TD)	Central Africa	CU/C	24	4
20	ADVANS BANQUE	Congo, Democratic Republic (CD)	Central Africa	BANK	9	3
21	COOPEC CAHI DRC	Congo, Democratic Republic (CD)	Central Africa	CUC	41	3
22	COOPEC CAMEC INKISI	Congo, Democratic Republic (CD)	Central Africa	CU/C	20	3
23	FINCA	Congo, Democratic Republic (CD)	Central Africa	NGO	14	4
24	HEKIMA	Congo, Democratic Republic (CD)	Central Africa	NGO	14	4
25	PROCREDIT	Congo, Democratic Republic (CD)	Central Africa	BANK	13	4
26	ESHET	Ethiopia (ET)	East Africa	NBFI	17	3
27	PEACE	Ethiopia (ET)	East Africa	NBFI	18	3
28	WASASA	Ethiopia (ET)	East Africa	NBFI	17	3
29	RELIANCE	Gambia (GM)	West Africa	NBFI	11	3
30	CRG	Guinea (GN)	West Africa	BANK	28	3
31	CEFOR	Madagascar (MG)	East Africa	NGO	16	3
32	MICROCRED	Madagascar (MG)	East Africa	NBFI	11	3
33	ONG VAHATRA	Madagascar (MG)	East Africa	NGO	21	4
34	PAMF	Madagascar (MG)	East Africa	NBFI	11	3
35	TIAVO	Madagascar (MG)	East Africa	CU/C	21	4
36	CUMO	Malawi (MW)	East Africa	NGO	14	3
37	MLF	Malawi (MW)	East Africa	NGO	25	3
38	OIBM	Malawi (MW)	East Africa	BANK	15	3
39	RMCR	Mali (ML)	West Africa	NGO	17	3
40	AFRICAWORKS	Mozambique (MZ)	East Africa	NGO	10	4
41	BOM	Mozambique (MZ)	East Africa	BANK	11	4
42	FDM	Mozambique (MZ)	East Africa	NGO	21	3
43	HLUVUKU	Mozambique (MZ)	East Africa	NGO	16	3
44	MECREF	Niger (NE)	West Africa	CU/C	21	3
45	NIYYA	Niger (NE)	West Africa	CU/C	16	3
46	AMASEZERANO	Rwanda (RW)	East Africa	NBFI	11	3
47	DUTERIMBERE	Rwanda (RW)	East Africa	NBFI	12	4
48	LETSHEGO	Rwanda (RW)	East Africa	NBFI	13	4
49	URWEGO BANK	Rwanda (RW)	East Africa	BANK	20	3
50	ACEP	Senegal (SN)	West Africa	CU/C	30	4
51	CAUIRE MICROFINANCE	Senegal (SN)	West Africa	CU/C	12	3
52	DJOMEC	Senegal (SN)	West Africa	CU/C	18	4
53	MICROCRED	Senegal (SN)	West Africa	NBFI	11	4
54	PAMECAS	Senegal (SN)	West Africa	CU/C	22	5
55	U-IMEC	Senegal (SN)	West Africa	CU/C	12	3
56	ACCESSBANK	Tanzania (TZ)	East Africa	BANK	10	4
57	BRAC	Tanzania (TZ)	East Africa	NGO	11	3
58	OPPORTUNITY	Tanzania (TZ)	East Africa	NBFI	10	3
59	VISION	Tanzania (TZ)	East Africa	NGO	21	4
60	FECECAV	Togo (TG)	East Africa	CU/C	22	3
61	FUCEC	Togo (TG)	East Africa	CU/C	34	4
62	MGPCC DEKAWOWO	Togo (TG)	East Africa	CU/C	17	4
63	MUTUELLE AKABA	Togo (TG)	East Africa	CU/C	18	4
64	BRAC	Uganda (UG)	East Africa	NGO	11	4

Source: Compiled by author based on literature review

Appendix 5: Characteristics of the Sampled Non-LISSA DTMFIs

	DTMFI	Country and Code	SSA Sub-regio	Charter Type	Age	Diamonds
1	A3C	Cameroon	Central Africa	NGO	21	3
2	ADVANS CAMEROON	Cameroon	Central Africa	NBFI	10	4
3	CAMCULL	Cameroon	Central Africa	CUC	49	3
4	CEC	Cameroon	Central Africa	CUC	23	3
5	ID GHANA	Ghana	West Africa	NGO	19	4
6	KSF	Ghana	West Africa	NGO	21	3
7	NWABIAGY	Ghana	West Africa	BANK	30	3
8	OISL	Ghana	West Africa	NBFI	13	3
9	VISIONFUND	Ghana	West Africa	NGO	17	3
10	WWB	Ghana	West Africa	NBFI	29	3
11	ADVANS CIV	Ivory Coast	Eastern Africa	NBFI	8	3
12	AE & I	Ivory Coast	Eastern Africa	NBFI	14	3
13	FIDRA	Ivory Coast	Eastern Africa	NBFI	11	3
14	MICROCREDIT CIV	Ivory Coast	Eastern Africa	NBFI	8	3
15	BIMAS	Kenya	Eastern Africa	NGO	20	3
16	ECLOF-KEN	Kenya	Eastern Africa	NBFI	23	3
17	EQUITY BANK	Kenya	Eastern Africa	BANK	33	4
18	FAULA MFB	Kenya	Eastern Africa	NBFI	25	4
19	JUHUDI KILIMO	Kenya	Eastern Africa	NBFI	8	4
20	KWIFT	Kenya	Eastern Africa	NBFI	35	4
21	MUSONI	Kenya	Eastern Africa	NBFI	7	3
22	OPPORTUNITY KENYA	Kenya	Eastern Africa	NBFI	5	3
23	PWADEP	Kenya	Eastern Africa	NGO	13	3
24	SIDIAN BANK	Kenya	Eastern Africa	BANK	30	3
25	SMEP MFB	Kenya	Eastern Africa	NBFI	20	4
26	VISIONFUND KENYA	Kenya	Eastern Africa	NBFI	17	4
27	AB MFB	Nigeria	West Africa	BANK	9	3
28	ACCION MFB NIGERIA	Nigeria	West Africa	BANK	11	4
29	BABURA	Nigeria	West Africa	BANK	12	4
30	DEC	Nigeria	West Africa	NGO	30	3
31	FORTIS	Nigeria	West Africa	BANK	10	4
32	GROOMING CENTRE	Nigeria	West Africa	NGO	11	3
33	HASAL MFB	Nigeria	West Africa	BANK	9	4
34	LAPO NGR	Nigeria	West Africa	BANK	30	4
35	SEAP	Nigeria	West Africa	BANK	19	4
36	CAPITEC BANK	South Africa	Southern Africa	BANK	16	4

Source: Compiled by author using data from the Microfinance Information Exchange